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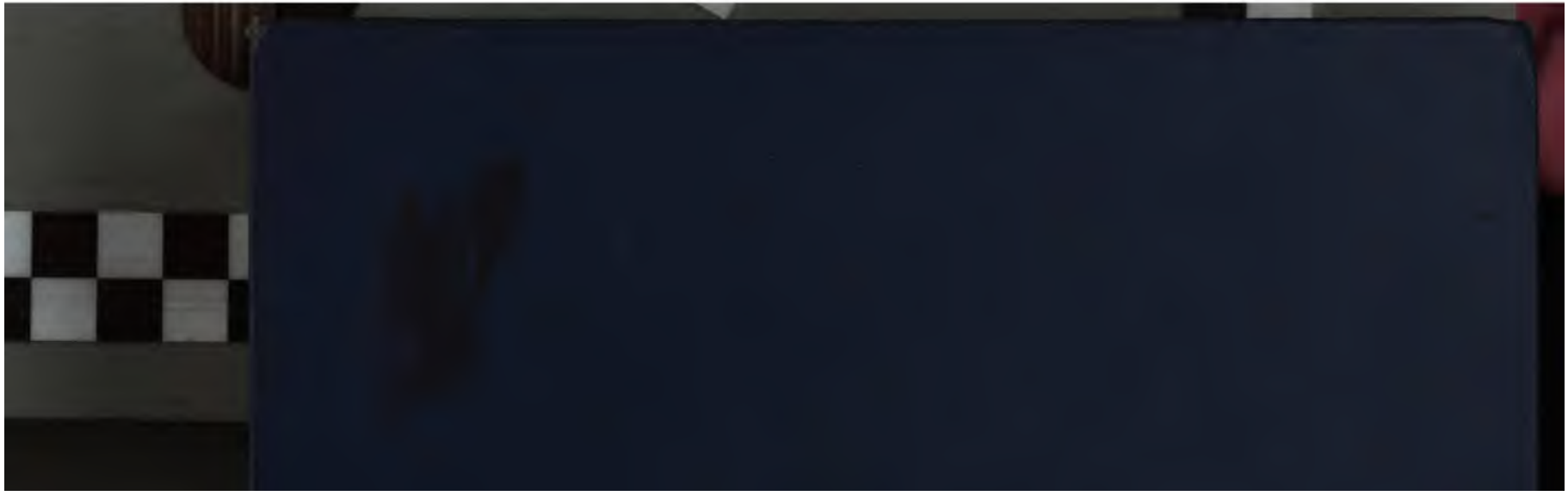
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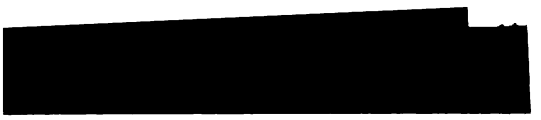
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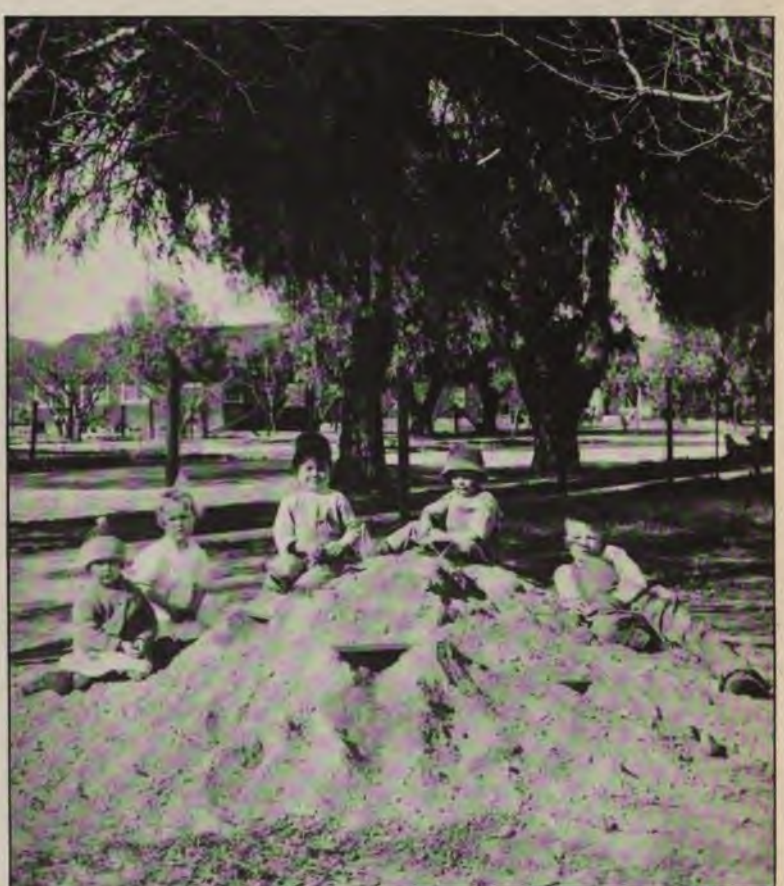
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LESSONS ON TUBERCULOSIS
AND
CONSUMPTION





MINING FOR HEALTH

Implanted in childhood as a rule, the seeds of tuberculosis do not take root unless the soil is fertile. The outdoor life and mild pastimes are efficient safeguards for this group of children.

LESSONS ON TUBERCULOSIS AND CONSUMPTION

For the Household

SHOWING

How to Prevent Tuberculosis
How to Recognize Its First Symptoms
How to Win Back Health

By

CHARLES E. ATKINSON, M. D.,

Recently Medical Director of the Seymour Sanatorium for Diseases of the Throat and Lungs, Banning, California; formerly Member of the Resident Medical Staff at the Pottenger Sanatorium for Diseases of the Throat and Lungs, Monrovia, Cal.; previously Attending Physician and Instructor in the Medical Clinic of the Graves Memorial Dispensary, Los Angeles Medical Department of the University of California; Member of the National Tuberculosis Association; Fellow of the American Medical Association, etc.

Illustrated



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FOREWORD

ALL who have given much thought to the study of tuberculosis have seen that many people have hardly a casual or speaking acquaintance with the subject. They have realized that lack of knowledge and misinformation have been responsible for numberless unnecessary and disastrous mistakes; that to-day the deaths from tuberculosis would be few indeed if *all* were acquainted with the main facts regarding the white plague. Only those who have themselves been "through the mill," or those who, for one reason or another, have been brought into intimate contact with a number of afflicted persons, can thoroughly appreciate how many there are who discover the truth so late that they are forced to spend years of effort and a fortune in the search for health—a search which, after all, in many cases, proves fruitless! And what countless thousands have been totally misdirected, to fall into pitfall after pitfall ere they finally won! Only those who have themselves made costly mistakes (and this means the majority of those afflicted with tuberculosis) can fully appreciate how easy it is to go astray—how hard it is to discover and keep on the road to victory.

Because I, too, have "played the game," because for years I have given the greater part of my time and attention to tuberculosis, I feel that I am able to put myself in the place of the "other fellow" who realizes that things are not quite right with him, but does not yet know just what is wrong—who *must* know *soon*, if he is to be given his due chance for recovery. I feel

also that I am able to understand the viewpoint of those who have just been informed that they are suffering from tuberculosis, and who are now making ready to build themselves into robust, useful men and women. As an expression of the desire to help those who are anxious to insure to their dear ones and to themselves the continued possession of that wonderful and tremendous asset and birthright—a strong and sturdy body —I have prepared these lessons.

True, a number of excellent books on tuberculosis intended for the general public have already been published. Yet, after all, what a small proportion of those who need the information are even aware that such works are in existence! Besides, so far as I know, there is no book which goes into detail on each and every phase of the subject on which the average man or woman desires accurate and specific answers. This book is the result of an effort to supply this need. In it I have endeavored to tell the story of tuberculosis in concise, non-technical, every-day language, and to present the lessons in an attractive, handy and practical form, so that ready and easy access will be provided to this or that part of the subject that most interests one.

The chief purpose of the lessons is to indicate the course of procedure that the competent physician will probably follow, and to outline in a general way the program he may be expected to map out for his patient. It will be found, also, that considerable space has been given to making plain the *how* and *why*, for I have felt that if the reasons for the various steps are understood, one will not only be enabled to select one's physician-friend and counselor to better advantage, but if the pursuit of health is taken up understandingly, it will be much easier and pleasanter to accept and follow the rules of living formulated by one's physician.

Both those who are in doubt as to the nature of their illness, and those who are seeking to rid themselves of its bonds, are strongly urged to put their case into the hands of a physician who has had a large experience in handling like problems. In Lesson VI will be explained why it is so important that great care be used in selecting one's personal physician, and will be pointed out how to make reasonably sure that one has chosen rightly.

Only when it is altogether impossible to secure the advice of a physician skilled in dealing with tuberculosis and in whom you place trust and confidence and with whom you will cooperate, should you attempt to manage your own case. However, if this course is forced upon you, a careful reading of the appropriate lesson, followed by a little thoughtful reflection, will very likely enable you to accept or reject the diagnosis of tuberculosis with sufficient accuracy to form a basis for future action. Should you conclude that you have tuberculosis, then by carefully and conscientiously fitting the rules for recovery to your own needs you may look forward with much confidence toward ultimately winning the coveted prize.

It is my earnest desire to make this book as helpful as possible, and criticism will be appreciated. I would like for the reader to feel perfectly free to express his opinion without restraint, and all suggestions for improving the lessons will be received with thanks.

In preparing the lessons I have received assistance from a number of persons and take this opportunity to acknowledge my obligation to all who have contributed their assistance in any manner. Dr. H. A. Putnam, of Monrovia, California, I wish to thank particularly for a number of ideas pertaining to the subject of dietary, and I am further indebted to him and also to the late



Kenneth Aitken, of Banning, for making several very helpful suggestions in regard to subject-matter, mode of expression and the like. I am especially indebted to Dr. C. C. Browning, of Los Angeles, Dr. Edward Preble, of New York, Dr. H. E. Kirschner, of Monrovia, and Mr. Carl Oaks, of the San Jacinto mountains, for suggesting additional topics for discussion, for proposing new or better ways of treating the subject-matter, or for other valuable suggestions.

C. E. ATKINSON.

BANNING, CALIFORNIA.



LESSONS ON TUBERCULOSIS
AND
CONSUMPTION



NOTE CONCERNING THE SCOPE OF THIS BOOK

Tuberculosis may affect any part of the body, but these lessons will deal mainly with its most frequent and important form, tuberculosis of the lungs, sometimes called pulmonary tuberculosis. Here and there, however, brief mention will be made of some of the other rather prominent forms of the disease.

LESSON I

GLIMPSES OF MANY IMPORTANT MATTERS

THE main object of this first lesson is to show that it is necessary for everyone to have some knowledge of the facts concerning tuberculosis. In it will be found hints on many phases of the subject, the chief aim being to secure the interest of the reader and lead him to seek further light. From a different angle, all the matters set forth herein will be more fully described in subsequent lessons; yet it is believed that through giving a broad view of the whole subject and a foreshadowing of what is to follow, the reading of this first lesson will prove of much benefit.

WHY EVERYONE SHOULD KNOW THE FACTS ABOUT TUBERCULOSIS

Not many years ago it was commonly true that he who discovered that he was a victim of "consumption" felt that his days were numbered. Altho the afflicted person believed that at all events he probably would live for a considerable time, and that by putting up a brave fight the end might be staved off for a longer period, yet deep in his heart lay the conviction that sooner or later, following a lingering illness, he would almost surely die as a result of the malady. Years later, under the growing light of scientific knowledge, many a dark and despairing soul was flooded with the sunshine of hope as the new view that tuberculosis is curable gained general circulation.

To-day, notwithstanding the fact that the disease is known to be both preventable and curable, it remains a menace to every household in the land. This plague still continues to attack more persons than any other equally serious malady, and kills a larger proportion of its victims than any other equally curable disease. Each year thousands of persons, just awakening to the realization that they have fallen prey to the disease and accepting at its face value the message of hope that has been spread broadcast, console themselves by looking forward to the bright future which they feel certain will come if they will only wait till the cloud of sickness has been wafted away. It is the sad truth that to many of these the bright day never comes; for a careful examination of the records reveals the astounding fact that only a minority of the persons who are attacked by the disease actually attain victory.

What Is the Solution of this Paradox of Curability and Fatality? To the heart that is yearning for the restoration of health, the bare statement that tuberculosis is curable seems rather meaningless when one sees himself going steadily downward. Fortunately the explanation is easy, and the remedy is at hand.

Knowledge the Key to Victory

The facts, which I wish could be stamped indelibly upon the mind of everyone, are as follows:

Early in its course tuberculosis is approximately ninety per cent curable. It is to be regretted that during this early period the afflicted person usually feels and appears so nearly well that often his condition is given little attention either by himself or his physician. Furthermore, even if the condition is recognized before severe inroads have been made on the health of its victim its effects are so slight that both the physician and his

patient are prone to neglect it; thus the one time when prompt and energetic treatment could have quickly ended the matter is often passed by.

Another stumbling-block has been the character of the measures that are of use in the treatment of the disease. The chief measures are so commonplace and so simple that often only passing thought has been given to their accurate application to the case in hand. The consequence has been that in numerous instances they have been grossly misapplied. **Thousands of persons have thrown away their lives through misdirected and therefore futile efforts, when success was right within their reach, had they but known how to grasp it.**

If uniformly good results are to be obtained, it is essential that the disease be recognized at the earliest possible moment. Owing to the fact that it is ofttimes difficult for even the most expert physician to detect the condition at this time, it is imperative that one be prepared to help one's physician in every manner possible. To this end it is necessary to have some knowledge of the disease in order that one may keep on the watch for its first manifestations. If then a physician who is expert in diagnosing and treating tuberculosis be unobtainable, by putting two and two together one may in many cases determine the nature of the illness with sufficient accuracy to warrant the taking of definite steps to combat it; these measures one can, if necessary, then carry out unassisted, with at least a fair chance for success.

"It Is Never too Late to Begin"

Lest the foregoing lead one to believe that there is no ground for hope if the disease has already passed the early stage, it seems necessary to add that there is a chance for all persons. Unless the ravages of the disease

be extreme indeed, you still have an opportunity to obtain the coveted goal, no matter how many times you have previously tried and failed. Perhaps your methods have been faulty; perhaps you did not keep at it long enough—at all events, with the proper key, the gateway to health can still be opened. There is no disease in which the saying, "While there's life, there's hope," applies with greater force. A brave fighting spirit, coupled with understanding and persistence in the face of great odds, has overcome the handicap of many a late start.

However, there is no question that, other things being equal, an early start in the race is a great advantage. If one has an understanding of the disease, the probability is large that it will be recognized before it has made much headway; the chance small that the remedies will be misapplied.

Hope based merely on the belief that one will escape the disease is often misplaced. For it must be remembered that the majority of the victims of tuberculosis have at one time cherished this same belief, only to find later that it was a delusion; and that some of them held the idea so close that unwittingly they blinded their eyes to the facts until the day for recovery had slipped by. So, too, hope based on mere faith that the disease will wear itself out, or on half-hearted or hit-or-miss methods, is in most cases soon lost. On the other hand, hope that is anchored in the firm bedrock of knowledge is the key to freedom.

Lessons Learned from Mistakes of Past

A wide variety of old and erroneous beliefs is still prevalent concerning tuberculosis. As many unnecessary and disastrous mistakes have resulted from a misunderstanding of the facts, a short review of the history of

the disease, and notation of the milestones marking the path of progress, will teach much of value. By observing the pitfalls one may learn to avoid them.

The Distinction Between Tuberculosis and Consumption. "As old as the hills" is a phrase which may be fittingly applied to tuberculosis. The disease is as old as history, and in its advanced stage of wasted flesh—the stage of "consumption"—was fairly accurately described by Hippocrates as early as the fifth century, B. C. Hippocrates also considered the malady curable; and other far-seeing observers, even at that early date, were convinced that the disease was contagious. A few hundred years later, there developed a belief in the value of a change of residence as an aid to recovery,—country air, especially near pine forests, being deemed particularly advantageous,—faintly foreshadowing by nearly two thousand years the general adoption of the open-air and climatic treatment. Galen, the physician to the notorious Nero, was among the first to recognize that the drier air of certain highlands possessed healing virtues.

Old Belief in Inheritance and Fatality Led to Neglect and Usual Failure. Until comparatively recent years, however, the great majority of persons—including physicians—believed that the disease was directly inherited, and as a rule fatal. For this reason, when the disease was recognized, the unfortunate victim was only exceptionally informed of the fact (even yet, too frequently is the true nature of the malady concealed under some less serious sounding name) and, as no effective treatment was instituted, he was usually doomed to a certain death. Often he was treated like a victim of a pestilence, and under the cruel influence of this unnecessary mental torture he went on alone, until death came to relieve his sufferings.

Later Excessive Optimism Led to Lack of Effort and Similar Failures. Much later, when it became more generally known that the disease is curable, a wave of excessive optimism swept around the world, giving rise to a new opinion—an opinion which held that recovery came more easily than the facts would justify. As a result, very little effort was made toward eradicating the disease until its inroads had become so extensive that the condition was truly hopeless. Very few attempts were made to diagnose the malady in its earlier and more curable stage. It was the custom of many physicians to make light of the disease,—in fact, such a course is altogether too common to-day,—sometimes saying that the patient would outgrow the condition; and that, at any rate, there was no use doing anything until marked symptoms developed. The physician often failed to foresee the ultimate unhappy ending which was probably in store for his patient, if allowed to drift along without management; and neglected the one opportunity when prompt, energetic treatment for a short time would have ended the whole matter.

Introduction of Outdoor Living

The First Sanatorium. During a long period of years, there was much groping after the truth, and many curious theories were evolved—later to be proven incorrect, and cast aside; but it was not until many centuries had elapsed that any decisive advance was made. In 1840, outdoor living, as a method for redeeming health, was introduced by George Bodington, an Englishman.

A little later, the search for a means by which the open-air and other treatments could be suitably combined and effectively carried out, led Bodington to found the first sanatorium for the treatment of tuberculosis. These two great steps forward were not accepted grate-

fully. Bodington was denounced and persecuted, and forced to abandon his sanatorium; and altho his idea took firm root, it did not bear fruit until nearly twenty years later.

In 1859, at Goebersdorf, Germany, in the Silesian mountains, Herman Brehmer, carrying out Bodington's idea, likewise established a sanatorium for tuberculosis. Altho Brehmer was also scoffed at and considered insane, his sanatorium lived. To-day, the properly conducted sanatorium is looked upon as a haven of rest for persons who are unable to obtain suitable conditions for recovery elsewhere.

In America in 1884, Edward L. Trudeau established in the Adirondack woods near the beautiful Saranac Lake, the great institution for the needy, which still stands—a monument to the name of this great pioneer. Trudeau's work gave a pronounced impetus to the movement that has been responsible for the establishment of a chain of well-equipped sanatoria, both public and private, in all parts of the world.

Fruitless Search for Imaginary "Land of El Dorado" Led to Many Unnecessary Disasters—Is Climate of Value? The effort to find the most suitable locality for the carrying out of the outdoor treatment early led to the search for a climate which in itself would effect a cure. It was then the custom for the invalid, on discovering his condition, to promptly sever all ties and give up everything—that he might make a journey in search for that wondrous spot supposed to possess almost magic power against tuberculosis. This search usually served only to add to the physical and mental suffering of the invalid, while he was led on and on, to find in the end that the quest was entirely futile. Yet, in some quarters, this excessive faith in climate prevails to-day, despite the fact that time and experience have taught that there exists no

climate having marvelous influence against the disease. Recently, some persons have interpreted this fact as meaning that climate is of *no* material value in combating tuberculosis; and therefore have neglected to obtain its moderate benefits. The truth is: Climate is a valuable remedy, but is to be looked upon only as an aid to other, even more valuable, measures.

From "Roughing It" to Rest. In spite of subjecting themselves to many hardships and deprivations and undergoing undue exertion, in these early days of climate worship, some recovered. Thus "roughing it"—or "getting back to nature" plus exercise—came to be looked upon as an important part of the treatment; from then on, exercise was taken up haphazardly by many persons during all stages of the disease. Altho this belief has since been proven incorrect, yet the retention of the idea by some individuals has been responsible for positive, forceful attempts at exercise at a time when rest was urgently required, and has led, unnecessarily, to many sad failures.

During late years, careful, conservative physicians in all parts of the world have become convinced of the great value of rest—as opposed to exercise—when the disease is gaining ground; this simple measure is now ranked by the most eminent authorities as one of the most valuable weapons in the battle against tuberculosis.

Let it be added, however, that exercise has not by any means been cast aside as valueless, but (if not overdone and taken with discretion) retains a place as a highly important and useful agency for later use in suitable cases in strengthening and preparing the convalescing patient for return to work.

The Discovery of the Seeds of the Disease

The Tubercle Bacilli. Near the beginning of the nineteenth century, the small lumps or nodules at the seat of the disease, called tubercles, had been recognized as the most distinctive anatomical feature of the malady, but the discovery of the cause of these structural alterations—the tubercle bacilli—did not come until years later. In 1865, Villemin, who had made many attempts to transmit tuberculosis to animals, finally saw his efforts crowned with success. He succeeded in transmitting the disease to rabbits, thus proving definitely that it could be communicated by other means than heredity.

It was not until 1882 that Robert Koch, then a little known health officer in a small German village, succeeded in proving beyond doubt that the germ now known as the tubercle bacillus is the actual cause or seed of the disease. Before arriving at a definite and final conclusion, Koch carried out four laws that he had formulated as necessary of fulfilment in order to establish indisputable proof that a particular germ is the cause of a particular disease. These rules stated:—

1. The suspected germ must be obtainable, either during life or after death, from every case of the disease.

2. A food or soil, suitable for the growth of the suspected germ, and relatively unsuitable for the growth of other germs, must be found; and the germ must then be grown upon this artificial medium or soil until a pure growth or culture is obtained—that is, a culture uncontaminated by the presence of germs of a different variety.

3. A susceptible animal must be found, and inoculated with a portion of the pure germ culture; eventually the disease must be established in the animal.

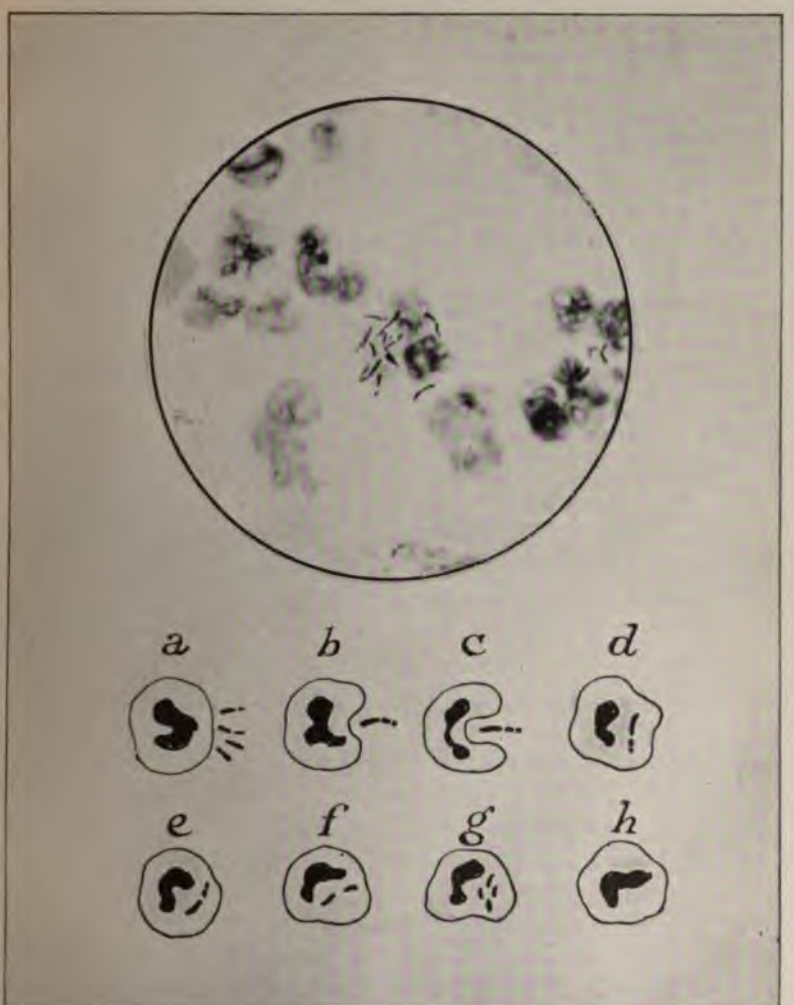
4. After death of the animal, germs of the same variety must be *recovered from its* body.

These laws, under the name of Koch's postulates, have since been accepted as fundamental principles, and have been successfully applied to many diseases.

The Casting Aside of the Belief in Inheritance. With Koch's discovery of the rôle played by the tubercle bacillus, there was forged one more link in the chain of evidence against the theory of heredity. Together, these discoveries started the movement that finally led to the general casting aside of the older view; this adding weight to the growing belief that the disease is transmitted by direct or indirect contact.

Recognition of the Part Played by the "Soil"—Importance of the "Dose" of Germs. More recently it has been learned that various accessory factors that sap the vitality, thus providing within the body a soil favorable to the sprouting of the seed, and thereby paving the way for the development of the disease, are as important causes as the tubercle bacilli themselves. It has also been learned that if the disease is to be established, the bacilli themselves must be taken into the body in large enough number to overcome whatever amount of resisting power the individual may have at that particular time. Additional light has shown that altho tuberculosis is almost never directly inherited, yet, through one influence or another, the new-born infant of tuberculous parentage is in many instances predisposed to an attack,—a condition which readily allows the bacilli to gain firm foothold.

Childhood the Great Danger Period. Still later investigations have established the fact that even tho actual symptoms of the malady may not appear until adult life, nevertheless, in the majority of instances, the seeds are sown during childhood. Thus, outbreaks in adult life, altho apparently primary, have been shown, as a rule, to be due to the reawakening of the



TUBERCLE BACILLI AND WHITE CORPUSCLES

In the central part of the photo (above) the black dashes represent a group of tubercle bacilli—the seeds of tuberculosis. The indistinct bodies are white blood corpuscles—Nature's soldiers—slightly out of focus. In the small drawings a corpuscle is shown changing its shape as it surrounds and destroys one of the germs.



slumbering germs—awakenings brought about by the intervention of one or more intercurrent influences, which serve to again give the disease the upper hand. In this manner, it has been shown that altho childhood is the great danger period, yet by the application of protective measures begun at birth, before the seeds have been sown, the disease can usually be warded off.

Revulsion of Feeling Against Doctors and Medicine. Many are the remedies that have been prescribed by physicians in the hope of finding a rapidly acting and certain cure. The taking of these remedies, as well as the swallowing by the victims—who are often willing to grasp at any straw—of a great variety of so-called "patent" medicines, which have flooded the market,—some of which have been positively harmful, and all leading only to disappointment,—has created a quite general feeling of disgust with both medicine and physicians. In fact, in many instances, the misguided sufferer has been instructed to "keep away from the doctors," or given similar unhappy though well-meant advice, which has often spelled defeat.

The Rise and Fall and Revival of Tuberculin

In 1890, Koch announced his discovery of a new remedy, tuberculin, which he believed to be valuable. The news was flashed round the world in greatly exaggerated form. Victims of the disease in all its stages made many sacrifices in order that they might go to Berlin to take the widely heralded "cure." Drawn on in the wave of enthusiasm, many physicians forgot all warnings about the dangers of the remedy and, giving it in even larger doses than Koch at that time recommended, irrespective of the extent or activity of the disease, etc., administered it to their patients haphazardly—for many of whom it was manifestly unsuited.

The result was that it was soon found that the glowing claims were not substantiated. High hopes were crushed, and a wave of skepticism swept over the world. Tuberculin was condemned, and its originator ruthlessly criticized. In later years, calmer judgment and ripened experience partly justified Koch's claims. Revived, and now employed in much smaller doses, his remedy was found to have value in certain cases, as an adjunct to other more important measures. Recently, again, renewed enthusiasm has, in some quarters, given the remedy too high a place. Patients who should have been resting have made long trips to physicians' offices for treatment; and other more essential measures have been neglected. Among the greatest authorities, however, the remedy has held its true place as an aid to recovery in selected cases.

Hidden Menace of Early Period of Convalescence. Shortly after the era of definite treatment began, it was observed that very slight changes in the mode of life, such as variation of scene or occupation, or a little rest, frequently produced a rapid change for the better both in the feelings and appearance of the victim. Quite often, so remarkable an outward improvement took place that, after a few weeks or months, considering himself well, the individual undertook too much; not rarely, as a result, a relapse, perhaps worse than the first attack, followed. Later, it was noted, especially in milder cases, that similar periods of improvement sometimes occurred spontaneously—absolutely without any change or remedy. From these observations, there ultimately developed the realization that **the early period of treatment, when the patient seems apparently well, is in reality a time of great danger**; and that, altho temporary improvement can usually be easily and rapidly obtained, permanent results require persistence for a

much longer period. Thus came the discovery that the element of time is a factor of extreme moment.

Dangers of Overeating. It was early learned that forced feeding was one means by which a rapid gain in weight could be obtained. The taking of enormous quantities of milk, eggs and other food then became common. Under this "stuffing" process the patient's appearance changed rapidly for the better, and it was not long until he felt that he was well. However, in many cases the extra burden of caring for so large a quantity of food proved too great a tax on his capacities, which sometimes gave way under the strain, resulting in heart or kidney disease, or in some serious derangement of the stomach or bowels.

Then too, after a time, the closer observers began to notice that true healing in the lungs did not keep pace with the accumulation of fat, and that the patient was given a false feeling of security that caused him to do many things that were harmful. For one or more of these reasons, it often came to pass that the flabby flesh was rapidly lost, and the invalid soon found himself in as serious or a more serious condition than before, perhaps handicapped further by the failure of the stomach or some other organ—these things in turn causing disheartenment or hopelessness.

As a result of these observations, that peculiar tendency of human nature to go to extremes then manifested itself in a growing feeling that the plan was of practically no value. The judgment of time has since shown that this general condemnation was not entirely justified: If its limitations and faults be kept in mind the method is worthy of occasional use under extraordinary circumstances, but only when moderately applied and carefully adjusted to the varying capacities and needs of different individuals.

The Modern View

A general survey of the progress of past years recalls to mind the familiar illustration of the swinging pendulum. In almost every phase of the subject, the application of the rule of extremes has at one time or another led to a reversal of opinions, resulting in some instances in the formation of new views as incorrect in one direction as the former were in the opposite direction. Finally, there has come a period of steadying down and of crystallization, resulting in the clean-cut view of to-day.

Practically speaking, tuberculosis is no longer considered hereditary, but an increased susceptibility may be inherited. The disease is transmitted from one person to another by means of the seeds, the tubercle bacilli, which are usually thrown off in the sputum. In order that the disease be contracted, it is necessary either that a sufficiently large dose or doses of bacilli be taken in to overcome the ordinary resisting power of the body, or that the resistance be lowered below normal through the influence of other factors.

In this disease "an ounce of prevention" is certainly worth much more than "a pound of cure." The means adapted to its prevention are simple. Childhood is the period of greatest danger, but there is also some danger of a primary or additional infection during adult life.

Tuberculosis is curable, and it is a fact that temporary improvement often occurs as a result of little or no change in one's mode of life; but the attainment of complete victory usually requires prolonged effort. Recognition of the condition at the earliest possible moment is of vital importance. In this connection, it has been established that in the early stage of the disease—the ideal time for its detection and treatment—the afflicted person

is hardly sick at all, and may outwardly seem entirely well. Yet many victims, apparently in a hopeless condition, have seen failure turn to success by the mere application of the maxim, "consistency plus persistence wins."

It is now appreciated that there is no royal road to health. Extravagant sacrifices are neither necessary nor wise, but some sacrifice is usually required. If one is willing to take the necessary steps, one can usually look forward to ultimate victory.

Concealment of the true state of affairs is no longer tolerated; for a realization of the nature of his illness is required if the individual is to make a definite and properly directed effort to recover his health. The afflicted person is no longer looked upon as an outcast; for it is recognized that **while the careless victim is a distinct menace to the health of others, he who is careful not only does not endanger those around him, but has a right to the pleasures of society.**

The Essence of Treatment

The modern treatment is a happy combination of the various elements, including rest and exercise, fresh air, food, a favorable environment, climate, and medical and sometimes surgical, treatment—each suited to the peculiar needs of the individual case.

The achievement of better results in recent years for the greater part has not been brought about by any radical change in the methods of treatment. It should be distinctly understood that more recoveries are obtained to-day, chiefly because (1) the disease is more often recognized at an earlier stage, (2) old methods are more skilfully applied and more accurately fitted to the requirements of the given case.

Suiting the treatment in each of its aspects to the

varying needs of each person is a vital factor, for it is indisputable that the application of a "rule of thumb" has caused many failures. This adaptation can best be carried out under the guidance of a competent physician. For many, at least during the initial stages of treatment, a residence in one of the attractively located, well-conducted sanatoria may mean the difference between defeat and victory. Here, away from the anxieties and temptations of business and home, and from the conflicting advices of friends, one is usually pleasantly surprised to find himself enjoying his stay. The fact that "everybody's doing it" results in a feeling of optimism that carries him along toward the goal, which is reached almost before he knows it.

The Extent of the Disease

Tuberculosis is the most nearly universal scourge. No country, no climate, is exempt from its onsweep. In certain places its victims are fewer in number, but no locality in which civilized man has been is entirely free from its ravages. The "great white plague" respects neither race, class, color nor creed; its victims are found among the high and among the low, among the rich and among the poor. Adolescents and young adults are its ready prey; certain races, like the Indian and negro, it attacks with especial violence; certain other races it has a tendency to slight; it has its favorites, but no one is absolutely safe.

Startling Facts and Figures. Within the confines of the United States there are at present, in round numbers, 340,000—one-third of a million—*known* cases of tuberculosis. Most of these persons are suffering from advanced tuberculosis; for as a rule the patient does not consult a physician during the early period of his illness; and if he does so, the true nature of the condi-

tion may be overlooked. The number going about with *unrecognized* tuberculosis is enormous. A conservative estimate places the actual number of persons incapacitated by tuberculosis (both recognized and unrecognized cases) at the present time, at 1,400,000. This estimation refers only to patients in whom the condition has advanced sufficiently to produce noticeable influence upon the health—the so-called *evident* or *manifest* tuberculosis (that is to say, the condition is spoken of as manifest tuberculosis when it has become evident to the afflicted person that something is amiss, altho, as just indicated, he is often unaware of the exact nature of the trouble); and **does not include the much larger number who at some time during life harbor a mere trace of tuberculosis but who show no outward evidence of the condition.** Many carefully kept series of statistics, based upon the records of thousands of autopsies and upon other reliable tests, bear witness to the enormous prevalence of the disease.

Averages One Victim in Each Family. Roughly, ninety per cent—nine out of ten—of all persons contract a certain amount of tuberculosis in some part of their bodies at some time during life. However, the majority of this number have only a trace; yet according to a moderate estimate, one out of six, or 16 per cent of all individuals, give outward evidence of definite disease (in the ordinary sense of the word—that is, they suffer from *manifest* tuberculosis) during some part of the life span. In other words, on the average there is one victim of the disease in every family.

During its so-called incipient, or first evident stage, tuberculosis is about 90 per cent curable; in other words, nine out of ten *should* get well. It may be well to add that this 90 per cent factor of curability concerning first-stage tuberculosis has been repeated so often and ac-

centuated so pointedly, that many have come to accept the figure as 100 per cent; and the viewpoint of some has even become so optimistic that they consider that the whole one hundred obtain a cure with little or no effort. There is no more ground for this belief than there was for the prevailing idea of thirty years ago that the disease was almost invariably fatal. **The view that tuberculosis is incurable and the opposite belief that incipient clinical tuberculosis is a matter of small consequence, which will mainly attend to itself, are both wrong. One is exactly as fallacious and as dangerous as the other. Both have led to neglect and been the direct cause of untold harm and many unnecessary deaths.**

Is Tuberculosis Always Serious?

It should be emphasized strongly that by the time tuberculosis has attained sufficient foothold to produce symptoms (evident or manifest tuberculosis*), the disease is always serious.

Altho it is probable that 90 per cent or nine out of ten, of early cases are curable, less than 50 per cent or one out of two, actually attain cure. (These figures include those who make every useful effort, those who make half-way effort, and those who make none. If only those who make no attempt to conquer the malady be considered, the number who recover is very much smaller.)

Unfortunately, there is no way to accurately foretell which persons will recover without much effort, and which ones will have to put up a vigorous, sustained fight. Those who are inclined to make light of the disease will do themselves a turn of vast benefit by recalling that

* Hereafter, in this book, unless otherwise stated, all references to tuberculosis are to be understood as pertaining to *manifest* tuberculosis.

in the life of nearly all patients there was a time when the symptoms were mild and the process just beginning; therefore, if a good result could be easily obtained in so many cases, why did the disease continue to progress to the second or third stage?

Death Rate of Tuberculosis Reduced, but Still a Great Peril. Formerly, one out of seven of all individuals died of tuberculosis. Due to the general adoption of outdoor living and of other hygienic measures, including the care of the sputum, the death rate from the disease has been considerably reduced,—in fact within the last thirty years it has been cut down almost 50 per cent—but even to-day one out of eleven deaths are directly traceable to tuberculosis.

Despite this great reduction in mortality, tuberculosis still stands as one of the most able lieutenants of the Grim Reaper, and annually in the United States alone, more than one hundred and forty thousand lives are sacrificed as a direct result of this disease. **Between the ages of fifteen and sixty approximately 30 per cent, or almost one death out of three, is ascribable to the great white plague. Between the ages of twenty and thirty-five, roughly, one death out of two is due to the disease.**

Notwithstanding the startling character of these figures, mere statistics fail entirely to tell the tale of the thousands who have been permanently crippled and whose deaths have undoubtedly been brought on prematurely by tuberculosis, although the immediate cause of death has been some other malady.

Some Vital Comparisons. According to the rule of averages, the individual afflicted with a mild attack of tuberculosis—that is to say, who has incipient *manifest* tuberculosis—is, if the disease be neglected, subjected to a greater danger than the victim of a severe attack of

pneumonia. Altho the course of tuberculosis may be drawn out from three to five, or even ten to twenty, years or more, yet the victim of tuberculosis is eventually the more likely of the two to succumb to his malady. The chance for loss of life from untreated incipient tuberculosis is in the long run many times greater than the chance taken through an attack of appendicitis; and **even without operation the hope of the victim of appendicitis for living to a good old age is several times more likely to be fulfilled, than is the hope of the sufferer from incipient tuberculosis if he allows his condition to drift along without proper attention.***

One point is sufficiently important to bear repetition. Practically one individual out of every six shows symptoms of tuberculosis at some time during his life, making an average of one member in every family. As matters have gone in the past, this one unlucky individual per family has had less than one chance out of two for recovery. On the other hand, he should have a 90 per cent chance **if the disease is at once recognized and the proper measures taken.** This 90 per cent of the afflicted will, however, realize recovery under present methods only when these methods are more generally put into effect than they have been in the past.

As seen from another angle: Of the one hundred million people alive in the United States to-day, under prevailing conditions approximately 90 per cent or ninety million now have, or will develop, a trace of tuberculosis infection. In 6 per cent, or sixteen million, the infection will progress to the development of genuine tuberculous disease (evident or manifest tuberculosis). Furthermore, unless a greater number than

* The death rate from pneumonia is approximately 35 per cent. The death rate from appendicitis, unoperated upon, is approximately 20 per cent. The death rate from manifest tuberculosis, if left to itself, is approximately 70 per cent.

have formerly done so discover their condition in time and at once begin effective treatment, more than one-half of this sixteen million—or nine million, that is 9 per cent of the total population, or one out of eleven of all persons—are doomed to die as a direct result of tuberculosis.

If Tuberculosis Is Preventable and Curable, Why So Many Failures? Of the many individuals who are suffering from unrecognized tuberculosis at the present time, many are deceived or are deceiving themselves into believing that they are afflicted with some other condition or ailment. A large number of these persons do not appear seriously sick; some do not seem sick at all. Because the symptoms in the early stage are as a rule so few, the majority of victims drift on into advanced disease before the real condition is recognized. Awakening almost too late to the danger that confronts them, they are forced to fight for years to obtain the goal, which at an earlier period might have been won in a few months. How often the cry of the disheartened sufferer has been raised **"Oh, if I had only known!"**

Perhaps you are one of these unfortunates; or perhaps you are fortunate in discovering your true condition early. Possibly you are unconsciously endangering your wife, your daughter, or other dear ones. May not some member of your own family be already within the shadow? By acquiring some knowledge of the disease you may protect both yourself and those around you, saving years of suffering or perhaps the loss of life.

An Answer in Advance

Critics may say that too much of the dark side has been shown here, claiming that this will cause unnecessary mental suffering, perhaps discouragement. The reply is that it is essential that the truth be stated—

neither minimized nor exaggerated—so that, after looking the matter squarely in the face, the sufferer will recognize the seriousness of his illness before it is too late. Certainly it is true that unless the true nature of the condition be brought home to them, few will take the steps that lead back to health. Only through a plain presentation of the facts will the mass of the people be awakened to this peril.

Detailed reference to the outcome of advanced cases has been omitted here, because it has been felt that by confining the attention to early cases only, the point would be emphasized that **even so-called incipient tuberculosis is not the negligible matter it has sometimes been considered.** There is hope for those with even the most advanced disease, but the application of proper measures at the earliest possible moment means not only money in the pocket but is the strongest insurance of success one can take out

In these pages you have gained some insight into several phases of the subject. In the lessons that follow, each of the topics herein mentioned, with many others, will be considered in detail. As you go forward you will find that each lesson is quickly mastered and that it is easy to apply the various suggestions, instructions and rules set down therein, to your own needs. Whether you wish to know how to prevent the disease, how it may be recognized in time, or how to win back health, you will find the knowledge gained to be of immeasurable value to you throughout life.

LESSON II

HOW TUBERCULOSIS IS SPREAD

The Seeds and the Soil

Just as each species of plant takes its origin from seeds of a special variety, so tuberculosis takes its origin from its own peculiar variety of seeds, which in this case are minute germs, called *tubercle bacilli.* Just as the seeds of the plant will not take root and mature unless the soil is fertile, neither will the seeds of tuberculosis, the tubercle bacilli, grow and multiply and cause illness, unless the particular tissues of the body in which the germs happen to lodge are at the time of their implantation in at least a fairly favorable or receptive condition. Thus, if the disease is to develop the bodily soil must be at least fairly fertile, and the seeds moderately abundant and reasonably vigorous.

Oddly enough, tho the germs of tuberculosis hold a titanic sway over the well-being of the human race, they appear under the miscroscope simply as minute, colorless, and seemingly inanimate rods, which are often slightly bent and have a tendency to group themselves in small clumps. Roughly, they resemble the dashes used in printing. Altho they are really living, single-celled organisms, their life is not made manifest by movement. In other words, tho they are living in the same sense that plants are living, their exact place in the vegetable or animal kingdom has not been definitely established. The familiar, comic conception of the car-

toonist, representing germs as many-legged, wild-eyed, long-beaked monstrosities, differs from the true picture of the tubercle bacilli almost as much as black does from white; for even when stained for more careful study, they appear merely as bright red rods of a more or less irregular or beaded contour.

The germs of tuberculosis are cast off in the sputum of the victim of the disease in enormous numbers, and are scattered almost everywhere. It has been estimated that a single afflicted person may eliminate in his expectoration more than twenty-five billion daily.

How the Germs Enter the Body

In nearly all cases, the germs are taken into the body either in the air that is breathed, or in food or drink. What happens after the germs once reach the throat depends upon several factors, to be discussed more fully a little later. Suffice it to say here that from the throat onward, the invasion may proceed by one of three routes:—

1. The germs may be swept on in the air current, into deeper portions of the breathing apparatus.

2. They may be carried onward in food or drink into the stomach and bowels. In this event, for the greater part they pass on in the excreta, without harm resulting. Not rarely, however, they penetrate the walls of the intestinal canal and, sooner or later entering the vital stream, are carried along with the current until (usually in the lungs) a soil suitable for their growth is reached.

3. They may enter the tonsils or other similar structures in the throat (including those small tissue masses that, when enlarged by disease, are spoken of as "adenoids") and thereafter by another roundabout route ultimately reach the lungs.

It seems well to emphasize the fact that all three

of these avenues are sources of danger through every period of life. Nevertheless, the breathing tract seems to be a more common portal of entry during adult life than it is during earlier years; whereas the digestive canal and tonsils appear to play a greater part in childhood infection * than they do after maturity is reached.

Why Everyone Does Not Acquire the Disease

With so many persons in all civilized countries, knowingly or unwittingly, continually spreading broadcast the seeds of tuberculosis, it may seem a great wonder that any one escapes. To this question there are several answers:—

In the first place, there is a wide variation in the vigor and power to work harm, among tubercle bacilli. It is to be understood that all of these germs are not exactly alike. While, of course, all of them belong to one great family, yet they differ among themselves in minor ways, just as one race of human beings differs from another in certain peculiarities. Of these races or tribes of the tubercle germs, the four following races are quite distinct and especially important:—

1. The so-called *human* type, which causes tuberculosis in the human being.

2. The *bovine* strain, which produces tuberculosis in cattle, commonly called "pearl disease," because of the translucent, pearl-like character of the tubercles—and which sometimes causes disease in man.

3. The *avian* type, which leads to tuberculosis in chickens and other fowls, and occasionally in animals.

4. The *reptilian* group, which produces tuberculosis in the cold-blooded creatures.

* By *infection* is meant that the germs have gained the upper hand over the defensive forces, at least for the time being, and have succeeded in gaining a temporary or permanent lodging in some part of the body.

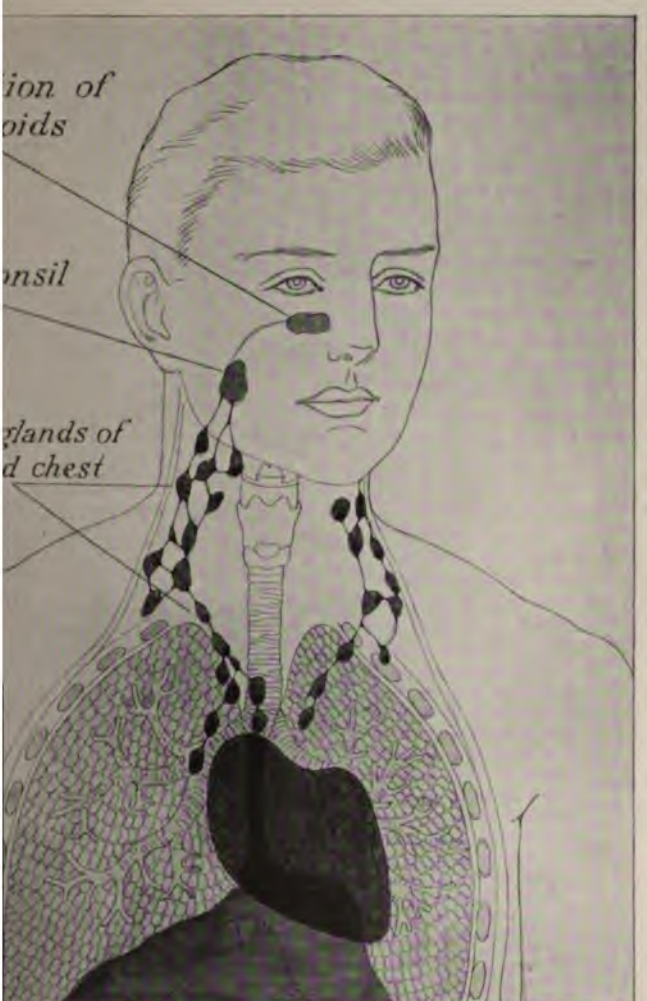
It will be noted that only the first two varieties menace the human being to any noteworthy degree. It is also worthy of mention that some of the germs even within the individual classes or tribes are highly virulent (dangerous), whereas others are only slightly so.

In the second place, we are also protected from the great horde of the tubercle germs sown almost everywhere, by the beneficent influence of the sun. Owing to the disinfectant action of sunlight, these myriads of germs are for the greater part destroyed, or at least weakened and rendered much less dangerous. Luckily it is also true that under ordinary conditions tubercle bacilli rarely if ever multiply outside of the body.

Yet in spite of these facts, from the cradle up nearly every person does take into his body a greater or less number of the germs of tuberculosis. Notwithstanding that many of these germs are decidedly virulent, no damage is done as a rule, because the well person has a certain amount of inherent resisting power which enables him to overcome the germs at once, before they succeed in gaining a foothold.

The Body a Fortified Citadel

Foreseeing that the human race would have many microscopic enemies, Nature wisely and generously endowed the body with several agencies of defense, through one or the other of which she hoped to resist successfully all attacks. In this protective scheme, that familiar and ofttimes troublesome organ, the nose, plays a simple but effective part; for as the germs are swept along in the current of the inhaled air, many are caught and held back by the small hairs just within the nostrils. Others are weakened or killed by the more or less germicidal secretions of the nose, or are cast away in the outflowing discharge. Should any escape this filter-like



GRAM OF BREATHING APPARATUS AND LYMPHATIC SYSTEM

ymph glands, including the tonsils, are the fortresses of the
if this system of defense fails, an actual pathway is provided
ntrance of the germs. Other avenues through which the germs
r are via the breathing passages and by way of the stomach.



mechanism of the nose and enter more deeply into the breathing passages, they, too, are usually wafted back without harm ensuing, by the wave-like movement of minute hair-like processes or lashes—called cilia—springing from the lining of the bronchial tubes.

In addition to these locally operative defensive devices, the body has also been supplied with a more general means of protection. As a matter of fact, Nature has constructed within the body a perfectly wonderful and intricate series of fortresses, the *lymph glands.* These fortresses, built in large numbers at all the most vulnerable points, are linked together in chain after chain by a maze of interlacing, communicating pathways, the *lymph vessels,* in which there is constantly flowing a protective liquid, called *lymph.* So, no matter by whatever portal the germs gain access to the body, one of these lymph gland outposts will almost at once bar the way to their further passage. For example, in the throat itself Nature has built a number of these protective barriers, including (1) the tonsils—which are really specialized lymph glands—and (2) those small, slightly protruding tissue masses in the vault or arch of the throat—previously mentioned—which, when enlarged as a result of disease, are termed "adenoids."

It is obvious that if these normally protective structures of the throat, guarding the passageways to (a) the stomach and bowels and (b) the windpipe, should become weakened by disease, they will not only lose their effectiveness as barriers but, like fortresses that have fallen into the hands of the enemy, will actually open up new gateways, through which the germs may pass; after which they may sweep on through Nature's system of communicating pathways (the lymph vessels), which have thus been converted into avenues of invasion, and enter right into the very interior of the body. How

important it is, then, for the throat to be constantly maintained in a healthy condition, so that its fortifications will always be in proper working order.

Then, too, the circulating liquids of the body, the blood and lymph, have germicidal and antidotal properties useful in destroying and weakening the germs and in neutralizing their poisons. More: The body has a huge army of millions and trillions of mobile soldiers (the corpuscles of the blood—both white and red—and other cells), ready at instant call to engage in combat with the enemy. So when Nature recognizes danger at any of her frontiers, numerous divisions of her immense standing army are rushed to the point of attack, while coincidentally she swells the ranks of her army with millions of new recruits and starts her munition factories running full blast to add to the germicidal and antidotal power of the blood and lymph.

In the great majority of instances the defensive forces succeed in destroying the first invaders. This is true, provided their number is relatively small and that they are not extraordinarily powerful. As a result of destroying the first germs, the ability of the body to resist a future invasion of the same variety of germs is augmented, at least for a time. (This statement is substantiated by a wide range of investigations carried out on animals.) So if the individual is unfortunate enough to receive later a larger dose of the same kind of germs, because Nature's protective forces now—so to speak—have been keyed up to a fighting pitch and become familiar with the fighting methods of the enemy—her forces will still be able to keep the invaders from gaining the upper hand and obtaining a lodging. Hence, even if larger and larger doses of germs should be taken in, provided the additional number of germs is not so great as to overbalance even the strengthened and in-

vigorated defense of the body, the individual gradually acquires a considerable fund of resistance—a so-called relative immunity—which is of material service in fortifying him against a future attack, and in favorably modifying the course of tuberculosis if it should develop.

If, however, at any time there be taken in a dose or doses of the germs so large that the body fails to vanquish them, or if for any reason the defensive forces should temporarily become depleted, the germs may assume control of the situation. This danger is of course accentuated if the bodily resistance fund be reduced, and the dose be increased, coincidentally.

Predisposing Influences

Here it may be well to point out the factors that deplete the body's defenses and hence predispose to tuberculosis. The principal predisposing influences exert their effect on the body as a whole, and are in a large part brought about through unwholesome working or living conditions. They include: (1) overwork, or undue physical or mental exertion of any kind, such as prolonged worry or great grief, (2) insufficiency of fresh air, (3) inadequate nourishment—which may or may not mean undereating, and (4) the abuse of alcohol. In other cases, certain diseases, particularly measles, whooping cough, la grippe, pneumonia, and even the supposedly mild and innocent everyday cold, seriously sap the defensive forces of the body and thus pave the way for the development of tuberculosis. With these factors in view, the influence of living in a crowded city, where one is almost constantly indoors, and where at any rate one is always surrounded by dusty and germ-laden air, is easily understood. Residence in an unfavorable climate, and exposure to intense cold and extreme dampness, altho

unquestionably of less moment than were formerly supposed, none the less have some bearing upon the acquirement of tuberculosis, and exceptionally, as in war-time, play a more prominent part.*

The Effect of Heredity

The fact has now been definitely established that direct hereditary transmission of tuberculosis is so rare that for practical purposes it may be disregarded. Notwithstanding this statement, it is well for it to be understood that the child whose father or mother suffers from tuberculosis may be born with a definite tendency or predisposition to the disease. This predisposition, or liability, is often a general one; in other words, the infant may be poorly nourished and weak at birth, and hence liable to be attacked by any and every ailment that comes along; including, of course, tuberculosis. On the other hand, it is possible and fairly probable that the child will inherit a specific inclination or susceptibility to tuberculosis.

This specific susceptibility may in turn be a general predisposition—a predisposition of the body as a whole to tuberculosis—or it may be brought about by the adaptation of the soil to the tubercle germs only in some particular part of the body—for instance, say, in the

* Occasionally the resisting power may be lowered only in some particular part of the body; the organ or part so affected, then becoming—as it were—a fertile soil for the lodgment and growth of the seeds. Thus, by way of illustration, a severe blow on the chest, or violent cranking of an automobile may so injure the delicate fabric of the lung as to fit it only too well for the lodgment of the germs of tuberculosis. Local injuries such as this are, however, comparatively unimportant as predisposing causes (of a primary outbreak) of tuberculosis. On the other hand, *once the disease has become active or manifest*, violence of this nature—being in direct opposition to the principle of rest—is then to be abjured at all cost.

A better example of harm resulting from local injury is found in athletes who, in striving to overdevelop their "wind," have so overtaxed the capacity of the respiratory organs (and heart) that the strain has created a point of lowered resistance—a local weak spot or fertile soil; so that later instead of finding the longed-for super-strength, their only reward has been the reaping of tuberculosis.

lungs. Yet a more careful scrutiny of cases has shown that the inheritance of a limited area of lowered resistance—a local "weak spot"—is less important than many assume. Heretofore it was quite generally believed that the person who was round shouldered and who had a long, narrow, and perhaps flat chest, was exceedingly liable to break down with tuberculosis; conversely, those who were full-chested and of a fairly athletic build were held to be almost immune to the disease. Now, however, the foremost investigators are coming to look upon the thin, flat chest as being more a result of disease rather than a cause. **The truth is that the individual who has a chest of this type is often already afflicted with tuberculosis, or has suffered from the malady in the past.** Less frequently, of course, some other illness may be responsible for the alterations; whereas in still other cases, heredity does have some bearing on the matter.

How Tuberculosis in Ancestry Has a Salutary Effect. Directly opposed to the passing on of a tendency to tuberculosis to the descendants it is a curious fact that the offspring of tuberculous persons may receive from the parents something which is an actual and positive aid to the child in warding off an attack. In this connection, the recital of some singular and illuminating facts, concerning the lives of several one-time, war-like tribes of natives inhabiting the Marquesas Islands in the South Pacific, may not be out of place.*

The Wrecking of a Once Powerful Race

A few centuries back, the savage dwellers on these islands, numbering some twenty thousand, were a race of extraordinarily hardy and robust individuals, wholly

* A popular, highly interesting and graphic account of the strange events that occurred on these islands may be found in Chapter X of Jack London's book, "The Cruise of the Snark."

free from blemish, physically perfect—a virile people to whom hardships were nothing and whose endurance was practically unlimited; who were in fact, from a physical standpoint, super-men and super-women. Cannibals tho they were, the Marquesans of that date were set down by more than one explorer and traveler as veritable sculptors' models. At that time sickness was almost unknown among the islanders.

Some few hundred years later the picture was entirely different. With the coming of the white man, bringing disease with him, the race fell heir to many ills, including tuberculosis, which swept like wild-fire through the communities, leaving in its wake a very different and saddened people. The race of athletes had become a race of feeble, tottering and gasping invalids, and even of these only a comparative handful remained.

One may well ask: What is the significance of this peculiar turn of events? In answer, it may be stated that the violence of the outbreaks of disease imported by the white man among these poor people was in large part ascribable to their nearly complete lack of familiarity with, and consequent lack of resistance to, illnesses of all kinds. Because for generations back the tribes had not known what the word sickness meant Nature had not been stimulated to fight disease, so when at last it came to them they were caught almost entirely unprepared.

As compared with the Marquesans, the ancestors of modern civilized man have suffered and fought with tuberculosis since the beginning of history. In consequence of the handing down of protective influences from generation to generation, notwithstanding the pernicious living conditions of the present age, we of a later day, despite our relatively disfigured and malformed bodies, escape the furious attacks of disease to

which the aborigines fall easy victims. Thus is explained the ordinary slow, chronic, comparatively mild course of the average case of tuberculosis nowadays. Hence, the very fact that at the present time the disease is usually of this type, lends support to the view that we inherit a certain amount of actual protection against tuberculosis. For if it were otherwise, the sick person would, as a rule, die in a short time, as a result of a severe acute attack.

The Effect of Inheritance in a Nutshell. In a word: (1) The child may inherit influences that make him prone to the disease. These may be (a) on the one hand, general, that is, favoring the development of all kinds of ailments, and (b) on the other hand, specifically predisposing him to tuberculosis, alone. (2) He may inherit influences that protect him against tuberculosis. (3) He may inherit both kinds of influences—both those that make him more liable to tuberculosis, and those that aid him in overthrowing or warding it off. On the whole, according to the overbalancing factor, the child may be said to be (1) predisposed, or (2) protected. In the average case, the sum total of the influence of heredity amounts to this: Other things being equal, the descendant whose parents have suffered from tuberculosis will be more inclined to contract the disease than will the child whose blood is free from taint—so to speak; yet, odd as it may seem, according to the law of averages, he whose ancestors have been afflicted with tuberculosis is, if there be any difference at all, likely to find the difference in his favor. That is to say, the disease in this case has a tendency (to which there are, of course, exceptions) to be of a milder, more curable, chronic type.

Condensed into a single sentence, heredity is seen to be not at all the tremendously serious factor that many believe it to be. In very truth, were it not for the fact

that our ancestors—either immediate or for years back—have been attacked by the disease, we who have come later would (provided tuberculosis should suddenly spring into existence) be swept from the earth by the far-reaching onsweep of the scourge in its most virulent form.

The Important Lesson Learned from Heredity. The one fact pertaining to heredity to which we should cling fast is this: **Even tho for generations back in successive families, one child after another, seemingly predestined to follow in the footsteps of those who have preceded him, on reaching a certain age has been smitten by tuberculosis, and has crumpled up and fallen as from a violent blow—even in such cases, the malady can usually be successfully and permanently warded off, if suitable measures are instituted immediately after birth, ere the germs enter the delicate young body and overwhelm its feeble defensive forces.**

Common Misconceptions

Just as certain persons are inclined to make light of the risk of acquiring tuberculosis from one who is already a victim of the disease, others are equally inclined to exaggerate the danger. For this reason, it seems well to lay emphasis on the fact that infection is as a rule a slow process. That is to say, multiple doses of bacilli (with quite a number of bacilli present in each dose), spread over a considerable period, are usually necessary to overcome the protective forces of the body. This explains how it is possible for some of us to escape, despite the daily, but passing, exposures of the street (chiefly due to promiscuous expectorating), in restaurants, hotels and the like, or as brought about through intimate, tho temporary, association with an afflicted person. As a matter of fact, one runs only slight chance through

casual contact of this nature, no matter if the afflicted person has the disease in an advanced stage. Moreover, even an occasional short visit with a very careless consumptive seldom leads to harm. The point should be emphasized that there is no danger at all of acquiring tuberculosis unless the afflicted person suffers from the "open" or communicable type of the disease. (In Lesson IV, p. 85 may be found a description of both "open" and "closed" tuberculosis.)

In the great majority of instances those who contract tuberculosis do so because they have lived for a long period of time in close association with a careless victim of "open" tuberculosis. As will be shown in a moment, such association is most harmful if occurring during childhood. It should not be forgotten, however, that it is possible for the germs of tuberculosis, scattered by inconsiderate persons, to remain alive for weeks or months in dark, dusty, poorly ventilated rooms, and to infect the next occupant.

Contrary to the rather common belief, there is no danger from the air expired by a consumptive during quiet breathing. On the other hand, during spells of violent coughing, and as a result of boisterous laughing and the like, the spraying of germs into the air is a distinct menace to those in the immediate neighborhood. The risk is especially great within the distance of four feet.

Childhood the Great Danger Period

At What Age Is Infection Most Liable to Occur? In answer it may be stated that the tender body of the growing child is the most favorable soil for the implantation and growth of the seeds of tuberculosis. For this reason infection most commonly takes place during early life. The new-born infant as a rule has but moderate

resistance against disease in general. Yet if from time to time it takes in only a few tubercle bacilli, even its scanty store of defensive force may prove adequate to protect it. In this case the germs are destroyed; infection does not develop, and the youngster's resistance is gradually raised. This means that if he is subjected to a larger dose of germs in the future, his powers of defense will perhaps be strong enough to overcome them.

On the other hand, if at any time so many of the tubercle germs are taken in that the defensive forces are unable to overcome them, the germs establish a colony within the body—and the child is said to be *infected.*

The child as a rule has more opportunities for infection than the grown person. During babyhood it is closely fondled by many persons, some of whom may have tuberculosis in recognized or unrecognized form; and for a number of years it spends a considerable portion of its time on the floor or ground, where germs settle. Moreover, it is continually picking up and putting into its mouth all sorts of objects, contaminated more or less with dirt and germs—from expectoration or otherwise. Likewise, cows' milk, which forms a large part of the little one's food supply, is frequently contaminated with bovine tuberculosis bacilli—thus adding another danger. All in all, if the boy or girl is housed with a person ill of tuberculosis (of the open or communicable type)—be it one of the child's own parents or another person—the child is almost sure to be infected unless the utmost precautions are taken.

What Happens After the Child Is Infected? It is not to be understood that all of the children in whose bodies merely a few tubercle germs have gained lodgment are outwardly ill. To be sure, in some cases, a heavy, even ineradicable imprint is left on the delicate bodies. In others, however, soon after the germs enter

bodily portals, the lymph gland fortresses effectually the way to its fertile fields (including, especially, the s). The defensive forces may then completely de- y the invaders.

low the Germs Slumber in the Body for Long lods. On the other hand, the affair has often a ewhat different and less decisive termination. In case, altho the progress of the germs has been ked, the forces of Nature prove inadequate to com- ely rout the enemy. Thereupon, a truce—as it —is declared, during which period the germs lie ibering or dormant for a longer or shorter time *ent* tuberculosis). As a matter of fact, the infection uently remains latent or dormant permanently, and youngster may tread life's pathway to a good old without experiencing one sick day from this cause. his instance, not only is the individual himself en- y unaware that his body harbors a colony of the is of tuberculosis, but the condition may be wholly tectable, except to the most expert and careful niner.

his state of affairs is sometimes spoken of as a mere rculous *infection*, to distinguish it from the more us condition in which manifest symptoms of ill th are produced, warranting the use of the term rculous *disease* (also called *evident* or *clinical* or *loped* tuberculosis).

hy Tuberculosis of the Lymph Glands Is Common hildhood. In yet other cases, the matter has a fortunate ending. It sometimes comes about that r the lapse of an interval of indefinite length, the is regain power, multiply rapidly and sooner or later ire mastery of the situation. Thus there is brought t an outbreak of manifest disease (evident or clinical rculosis). If the germs are thus able to assume

the control in the *lymph glands*, but are unable to make further headway, the result is evident *glandular* tuberculosis—formerly termed "scrofula." Because the germs enter the lymph glands soon after they are taken into the body, this form of the disease is relatively common in childhood—less so during later years.

If, however, for any reason, the germs should slip by the lymph gland barriers, they will be swept onward in the lymph and blood streams until, in some part of the body, a soil adapted to their requirements is reached. If they pass these barriers during *childhood*, the bony structures of the body (which at this time are comparatively soft and non-resistant) will not unlikely furnish the soil qualities suited to the germs. In this case, bone or joint tuberculosis—the "white swelling" of former years—will develop.*

Again, the germs may find in the lungs favorable conditions for their growth. Should the germs lodge in these organs during the earlier years of life, while the resistance is still at a low ebb, the resulting outbreak of the disease will probably be of an acute, severe character, and in its onset may resemble pneumonia quite closely ("galloping" or "hasty" consumption). Should the outcome of the attack prove favorable, improvement will set in; but complete recovery probably will not take place at this time. Instead, the type of the disease is likely to undergo a gradual change into the ordinary, milder and more curable, chronic form of tuberculosis.

In recent years a vast number of painstaking investigations conducted from widely different angles have proven

* Lest what has been said in the last two paragraphs give rise to misunderstanding, let it be explained that not all chronic enlargements of the lymph glands are due to tuberculosis, nor is every case of "white swelling" due to this cause. Without going into detail, it should be made plain that altho tuberculosis is a frequent cause of these conditions yet other diseases frequently operate to produce chronic enlargement of the lymph glands, and bone and joint disease of the "white swelling" type is not rarely due to some other cause.

beyond a doubt that in many (at least a majority) of the cases of tuberculosis apparently originating in adult life, the seeds are in fact implanted in the body during childhood. There they rest, in an inactive or latent state, until at some future date (ordinarily between the fifteenth and thirty-fifth year) some circumstance arises that weakens the protective forces of the body or invigorates the germs,* permitting them to get so firm a grasp upon the individual that noticeable symptoms occur. (Oddly enough, Nature has greater difficulty in disposing of the original invaders that entered the body in childhood than in disposing of germs freshly taken in. The explanation is that the bacilli causing the original infection have had time to become adapted to their new environment and to develop weapons of their own against those of Nature. On the contrary, bacilli just taken in are unprepared to meet the new conditions and are more easily overcome.)

*It has been noted that in many cases of undoubted tuberculosis tubercle bacilli can not be found in the sputum even by repeated examinations, and this very naturally led to the belief that the bacilli must at some time undergo a change whereby they lose their ordinary characteristics and peculiar staining properties to take on entirely different characteristics and properties, in which stage they are unrecognized by present methods. This has led to careful investigations, with the result that certain research workers, notably Ferran, of Spain, have come to believe that in their life cycle the tubercle bacilli undergo a process of mutation, passing through several evolutionary phases, and that only at times are they very virulent or harmful. According to this view, bacilli which at the time are harmless are often taken into the body during the earlier years of life, and tho remaining apparently dormant for years, yet as they become adapted to their new surroundings they actually undergo a gradual transformation with the acquirement of increased virulence—thus accounting for outbreaks of manifest tuberculosis in adult life.

This explanation points the way to early treatment which aims to prevent the disease, tuberculosis, by destroying the bacilli or increasing the bodily defenses against the bacilli in the most vulnerable period of their life cycle—during childhood.

Vaccines, said to be prepared from bacilli during a harmless phase, have been devised, and it is not unreasonable to believe that by the use of these preparations protection may be afforded against more virulent bacilli. However, it is at present too early for the formation of definite conclusions as to the value of preparations of this type.

Precautions Necessary at All Ages

Lest the foregoing remarks be construed as implying that precautions are unnecessary after the first few years of life have been safely passed, let the point be emphasized that there is some chance of acquiring a primary infection during adult life. It should be remembered also, that, even tho the body already harbors an infection (either dormant or progressing), it would be folly to run the danger of adding fuel to the fire by carelessly allowing further tubercle germs to enter the body. Moreover, if it is borne in mind that the great majority of civilized human beings are infected during childhood, one sees the importance of endeavoring to so live throughout the entire life span as to keep the resistance always at the maximum—to prevent the smoldering infection from flaming up into an outbreak of manifest disease.

LESSON III

HOW TO PREVENT TUBERCULOSIS

In this lesson the knowledge gained from a perusal of Lesson II will be translated into practical rules. Consequently, if anything that appears in these pages is not perfectly clear, the meaning will probably be made plain by referring to Lesson II.

Simple Precautions May Save Untold Misery

The watchword in the crusade against tuberculosis should be *prevention;* for by the use of a little foresight and preparedness, untold suffering, years of blighted usefulness, life and fortune, may be saved.

Happily, the antidote to the onsweep of the disease is simple—moderate, tho continual, attention given to apparently trivial matters, usually sufficing to protect one. In general, the methods of prevention fall under two heads: (1) Those adapted to the destruction of the seeds of the disease, and to the avoidance of their implantation within the body. (2) Those that strengthen the body and build up its resisting power, so that if perchance large numbers of the seeds be taken in, they will fall on stony soil and not take root. Furthermore, the endeavor should be to avoid all things that experience has shown serve to render the soil fertile. As the subject unrolls, one will see what these influences are.

The safeguards herein described are useful not only in guarding one against the acquirement of the merest trace of tuberculosis, but are equally effective in preventing the

relatively benign *trace* from developing into the *manifest* disease. They will also prove effective in preventing "closed" tuberculosis, which offers no menace to others, from progressing into the dangerous "open" type.

It is important that the measures of prevention be put into effect immediately after birth. However, if this is not done, they should be instituted during later years, and at all events should be continued throughout life.

Excessive Fear of Tuberculosis versus Common Sense

How often one runs across a person who has so great a horror of tuberculosis that he dreads to associate with a victim of the malady for even a short time, or has an almost fanatical fear of contracting the disease through the inhalation of germ-laden dust on the street. There is no sound basis for this unreasonable and foolish fear. The disease is not "catching" in the same sense that measles and scarlet fever are "catching"; that is to say, tuberculosis is not acquired through casual or temporary contact or near-contact with a victim of the disease. It is seldom transmitted except by a long and intimate association of weeks or months; even then, there is no danger unless the disease has progressed to the communicable "open" stage, and in addition, the afflicted person be careless in the disposal of the sputum. Altho every reasonable precaution should be taken, particularly during childhood, and while association with a careless victim of "open" tuberculosis is to be avoided at all cost, the tendency to shun the afflicted person who is careful and considerate of the rights of others is an unnecessary cruelty.

"Those Who Live in Glass Houses." There is a certain type of individual, himself suffering from what he believes to be "weak lungs," "catarrh," "asthma" or

the like, who looks upon his neighbor who has openly stated that he is afflicted with tuberculosis, with a sort of holy horror. Such a person, unknown to himself perhaps, actually suffering from advanced tuberculosis and unwittingly scattering its seeds far more widely than his better-informed and more careful friend, would therefore do well to put into practise the Biblical advice of searching out the mote in his own eye.

Answering a Common Query. Into the minds of those who realize (as described in Lesson II) that so long as tuberculosis continues to exist, the taking in of a few bacilli from time to time serves a useful purpose—each germ successfully combated by the body adding just that much more to its store of fighting power—there sometimes comes the question, Is it advisable for an attempt to be made to destroy all the seeds of the disease?

The answer is: Yes; very much so. Everyday risks make the taking in of a few tubercle bacilli almost certain; so one may use all reasonable precautions against infection and make every effort to do away with the germs, with the assurance, notwithstanding, that the minimum doses of bacilli necessary for protection will almost surely be acquired.

Safeguards for Children

Altho the seeds of tuberculosis are scattered broadcast almost everywhere lying in wait for the infant, their implantation within the tender body can usually be averted if the parents are awake to the peril. Precautions are all the more essential if the father or mother is a victim of the malady. Lest their heartstrings be wrung by a late realization of duty neglected, they should make the most of every means to guarantee their dear one its complete allotment of strength and health until it is old enough to look after its own interests. They should

remember that largely in their hands lies the decision as to whether the youngster is to be given an even start in the world—a start that will put him on a footing of equality with his competitors—or whether he is to go through life handicapped by a health unnecessarily ruined at the outset.

In a word, this means simply that from birth on the child should be raised properly, guarded carefully, and so fortified that it will be given the best chance for withstanding such accidents and diseases as inevitably occur.

Especial Watchfulness Needed at Time of Puberty and Adolescence. Protection is necessary at all ages, but at the time of puberty and adolescence watchfulness should be increased. When youth begins to find itself, and when the boy and the girl enter the domain of manhood and womanhood, are times of special danger—periods when the first breakdown in health is liable to occur. As the young man and young woman experience the first real glow of life, they are apt to feel competent to do almost anything; bubbling with life, they wish to try themselves. Ambition and uncontrolled impulses may at this time easily lead them into many harmful adventures. With gentleness and firmness tinctured with patience and tactfulness, parents may curb these tendencies of their loved ones.

Protection Not Synonymous with Coddling. On the one hand, the parents should be on the alert to detect the earliest symptoms of disease, in order that more rigid measures may be instituted; on the other hand, it is important that the safeguards be put into effect in such manner as will avoid "spoiling the child," thus making him into an oversensitive, fearful and nervous being, afraid to depend upon himself for anything. In keeping with this advice, it will be shown later that *protection* is by no means synonymous with coddling.

Food for the Growing Body. Nutrition is the backbone of resistance; so from babyhood on, no pains should be spared to see that the child has the best of simple, nourishing food.

Mother's Milk Best, Unless for Special Reason. Because no man-made food can satisfactorily take the place of that supplied by Nature, it is essential that the infant be nursed by the mother—if she is healthy; if sick, for the good of both mother and infant, some other plan should be arranged.

If obtainable, a wet-nurse is then perhaps the best solution of the problem. It goes without saying that such a nurse should be selected with great care, and that a health certificate should be demanded of her.

The Dangers of Impure Cow's Milk—Goat's Milk. Clean, pure dairy milk, properly diluted and modified,* is ordinarily the next best substitute for mother's milk. In passing, it may be noted that goat's milk has one great advantage over cow's milk, in that it seldom serves as a vehicle for the conveyance of tuberculosis—goats rarely contracting this disease. On the contrary, cows are very frequently afflicted with tuberculosis, and contaminated milk is an important medium for the transmission of the disease, especially in childhood. (The danger of acquiring the disease by eating the meat of tuberculous cattle is comparatively slight.) Moreover, goat's milk is unusually rich, and analysis has shown that it bears a closer resemblance to the human breast milk than does cow's milk, while experience has demonstrated that goat's milk is likely to be more easily handled by delicate stomachs. Incidentally it may be added that goat's milk does not have a strong, repellant odor or taste, as many suppose.

* In some cases, one of the prepared food mixtures, such as Dennos', Nestle's, Eskay's or Mellin's Food may be used to advantage in modifying the milk.

The Source and Care of the Milk. In most communities, however, cow's milk is the only practical milk for general use; and, if uncontaminated, gives fairly good results. Milk from tuberculin tested cattle, certified milk, or milk that has been pasteurized (heated to 140°-160° F. and maintained at this temperature for one-half hour), should be obtained, if possible. Unless the source of the milk is known to be right—that is, unless the cow not only appears healthy, but has actually been proven free of tuberculosis—and unless the conditions connected with the collection, storage and distribution of the milk are known to be good—milk from a *herd* of cattle is safer than milk from one cow. Milk from a single source, if contaminated at all, is dangerously contaminated; in "mixed milk" on the contrary, the injurious influence of one sick cow may be largely counteracted by the effect of dilution with the pure milk of other cows.

Other Substitutes for Mother's Milk. When satisfactory fresh milk cannot be obtained, dried, evaporated, or condensed milk may be used.

In the last few years, investigations and experience have proven that while condensed milk is not the most desirable food for the child, yet it is a much better food than was formerly supposed. Heating or even boiling the milk, a process incident to its manufacture, instead of rendering it more difficult of digestion, as was previously assumed, has been shown to really facilitate digestion. Nevertheless, heat injures certain principles in milk that are especially vital to the health of the child—vitamines (more fully discussed in Lesson X); moreover, the constipating effect of milk is increased by heating it. For these reasons, milk should not be heated unless absolutely necessary. Furthermore, as a precautionary measure to offset the detrimental effect of heat on the vitamines, children raised upon evaporated, condensed, or heated milk,

should be given fruit juice of some sort, such as orange juice, regularly each day.

Formerly, much of the injurious effect of condensed milk was attributed to the large percentage of sugar it contained. Nowadays, however, in the many brands of unsweetened evaporated milks on the market, one is offered a wide selection of excellent milks, almost any one of which, when properly diluted and modified, furnishes the various ingredients in proportions more nearly corresponding with the needs of the young body.

Every effort should be made to provide the youngster with fresh, sweet milk, and in many communities arrangements have been made for supplying wholesome milk to the poor at public milk stations, entirely free of cost. But for those who cannot obtain satisfactory fresh milk, or who have no way of keeping the milk in good condition, evaporated or condensed milk may prove a blessing. (Evaporated goats' milk is also to be had, and is to be preferred in certain cases.)

Because of its lesser content of sugar, etc., evaporated milk is ordinarily more healthful and as a rule should be given the preference over condensed milk. However, when it is necessary to keep the milk for several days or longer after opening the can, and as a matter of convenience on long journeys, the thicker condensed milk may be best.

Dried milk or milk powder is another convenient preparation of merit when fresh milk is not to be had. Dried and evaporated milks have somewhat the same objections and advantages, tho the milk powder is perhaps less constipating and retains a larger quantity of vitamines. In appearance and taste the milk mixture prepared from a dried milk powder is more like fresh milk than is evaporated milk; but the preparation of the product is somewhat more troublesome.

A Loathsome and Dangerous Habit. Unfortunately there still exists in some quarters the habit of feeding the child food that has been previously chewed by the mother or other person, so a forcible warning against this loathsome custom becomes necessary. Under no circumstances whatever should anything be allowed in the mouth that has been in the mouth of another person, either child or adult. Nor should the food of the child be cooled by blowing the breath upon it.

From early infancy the little one should be taught to put nothing in its mouth but food or drink; later, as it grows in knowledge, its broadening mind may be imbued with the truth that swapping apple-cores and putting pencils, money or other objects in the mouth are decidedly dangerous.

Separation from the Sick Essential. The infant should not remain with the sick mother, or near others who are ill. It should be kept well separated from the sick—in another room if possible—and should be cared for by a well person.

If the family's means be so limited that suitable conditions and care for the baby cannot be provided in the home, the mother can sometimes best show her love by allowing the little one to be removed entirely from her for a time. It may be that a Children's Home or Children's Hospital, or even better, a Tuberculosis Preventorium, is near at hand, or that some private home is open to the infant, where it will be sure to receive good care. Later, when her dearest treasure is returned to her, the mother's first glimpse of the happy face, wearing the bloom and vigor of health, will fill her heart with joy and a feeling of great gladness that through a willingness to make a sacrifice and to accept temporary deprivation, she has saved her darling from a life-long handicap. More: Owing to the fact that the mother has had a rest

from the care of the child, she now finds herself able to give the little one many attentions which in her former condition she was totally unable to give. As the mother continues to improve and the infant buds out into the child, the love-bond that joins them becomes more and more firmly knitted.

Life Under Nature's Canopy

Too many children, brought up like hot-house plants, starving for air, wilt and fade just as they should be blossoming out into glorious young manhood and womanhood. If there is one thing every growing youngster needs in large quantities, it is plenty of fresh air. From its earliest years, the child should be encouraged to spend a large part of its time out of doors. Fresh air is just as important for the infant as for older children, but of course more care is required in accustoming the very young and delicate form to atmospheric changes and the like. An outdoor sleeping room and day nursery, so equipped with adjustable curtains or similar devices as to furnish reasonable protection from extreme cold, strong drafts, and from direct intense sunshine, where the little tot may sleep and later play, will mean much for its future welfare. Unless the weather be inclement, the baby should be wheeled daily into the open.

Outdoor Recreation and Moderate Exercise a Necessity. As the child grows and thrives, mild outdoor recreation that does not require violent exercise should be found for it. For example, a sand pile, which holds strong allurement for many of the little folks, may be provided at small outlay, to which other suitable attractions may be added, thus furnishing a form of amusement that is nearly ideal—one that has been worth almost its weight in gold to many a one-time young tuberculosis candidate.

Unless the child be afflicted with *evident* or *manifest* tuberculosis (a definition of these terms may be found in Lesson I, p. 31), exercise *in moderation* is a necessity, if it is to develop that ruggedness of health which is to serve it as an efficient bulwark against disease. When at play, it should be guarded carefully against overexertion, and should be taught to take frequent periods of rest. Parents should never lose sight of the fact that at best, the fund of resistance of the little tad is small; they should therefore spare no effort to prevent the bubbling and exuberant youngster from drawing too heavily on this rather meager account.

Indoor amusements such as moving pictures, which are almost invariably associated with "bad air" and other injurious elements, are to be avoided by all who are predisposed to tuberculosis.

Clothing for Children

The modern tendency is to burden the body with too heavy clothing. This is especially true during the summer. While enough clothing should be worn to insure adequate protection, the matter should not be overdone. Excessive clothing makes the child so dependent on artificial protection that when it meets with unavoidable exposure, it is much more liable to be injured than if it had previously been accustomed to a minimum amount of clothing. Thus the very object for which one is striving—the development of a sturdy body that will resist disease—is defeated; and in fact, the opposite condition (predisposition) is cultivated, which only too well fits the child as a candidate for all manner of ills.

Cold Sponging as a Body-bracer

After the first few years, or even earlier in suitable cases, daily cool sponging of the body of the child (ac-

cording to the directions given in Lesson XV) will greatly help to strengthen and invigorate it.

If the child be gradually accustomed to light clothing; if with this, cold sponging of the body and the open-air life be wisely combined, then after a reasonable trial one will often be most agreeably surprised at the change in outward appearance and the amount of hardening and resistance to exposure and disease which has been acquired by the now hardy youngster.

Ills of All Kinds to Be Avoided

Every means should be used to shield the child from all diseases, including even the very ordinary ailments. The young body is no longer looked upon as the legitimate prey of disease, and the old custom of accepting the illnesses of childhood as inevitable heritages, as exemplified by the saying, "Oh, he might as well have it now as later," has given way to the understanding that these outwardly mild disorders are in fact decided evils, which may result in great and permanent harm. Fortunately, it is also now recognized that in many cases it is possible to ward off these sicknesses throughout life. Among those that are especially to be guarded against are measles, whooping-cough, la grippe and pneumonia, as they too often prepare the child for an outbreak of tuberculosis. The common cold, too, is no longer despised, but is rather to be shunned as a forerunner of more serious disease.

Care of the Mouth, Nose and the Throat. Modern science has shown that in one way or another, unhealthy conditions of the mouth, the nose and the throat at times play an important part in the development of tuberculosis. In some cases there are hidden pus pockets in these parts, from which seeps out an insidious poison that gradually undermines the health; sometimes the

harm is wrought in other ways: whatever the manner, it is imperative that a healthy state of these organs be maintained. Sometimes the trouble lies in or surrounding the roots of the teeth, and is only revealed by a careful examination in which the X-ray plays a part. The teeth should assiduously be kept clean, and repaired when necessary. In keeping with this endeavor, parents should not forget that an early dollar in the dentist's pocket may mean many dollars in one's own pocket later. The nose and throat also are sources of considerable danger. Enlarged turbinate bones or other forms of nasal obstruction, and disease, such as catarrh, should receive prompt attention from the expert.

What Is to Be Done with Diseased Tonsils? Diseased tonsils are an especially fruitful source of illness and should receive proper treatment. In this connection, the fact should be kept before one that when in healthy condition, these organs are strong links in Nature's system of defense against disease (as described in the preceding lesson). It is then highly important that they be left alone. On the other hand, tonsils that are seriously and chronically diseased, and adenoids (comparable to fortresses that have fallen into the hands of the enemy) serve to smooth the path for the advance of disease, not only indirectly by sapping the vitality, but by providing open gateways through which the germs of tuberculosis may enter the body. In this case, having lost their usefulness as guardians of health, unless there be some reason why the operation should not be performed, it is just as essential that these breeding pits and obstacles to health be promptly removed.

It is well to emphasize the fact that tonsils that endanger health are not necessarily of the large, protruding variety. As a matter of fact, some small "buried" tonsils are in worse condition than others that project

far into the throat, and the need for removal of such "hidden" tonsils may be even more urgent.

Fortunately, to-day, in many cities, routine physical examinations are made of all children of school age. In this way many a youngster whose parents were previously unsuspicious that the health of their dear one was mortgaged by adenoids or crippled tonsils, have had the encumbrances removed in time to give him a clear title to health.

If the child is subject to recurrent attacks of tonsillitis, the operation is usually more safely performed between attacks. It is essential that the operation be a thorough one—that the tonsils be not merely clipped off.

A Gratifying Transformation. In many instances, as a result, the young patient undergoes a remarkable and sometimes astonishingly rapid transformation. When the anxious and love-hungry parent sees the hitherto dull, backward, and rather sickly youngster begin to brighten and show an interest in things, developing an ability to grasp matters that were formerly beyond his range; when at the same time he sees the pale, wan face take on the rosy tint of health, he is glad indeed that through his foresight the youngster has come into his own.

School Days

When the child reaches the school age, it should if possible be sent to one of the schools held mainly in the open air,* now rapidly springing up in many parts of the country. These schools, suitable for all children, but adapted especially to those who are delicate, where study is wisely combined with periods of rest, offer the child who is predisposed, or who has a *trace* of tuberculosis

* For information regarding open-air schools and fresh-air classes in the various states, correspondence is invited with the Elizabeth McCormick Memorial Fund, 315 Plymouth Court, Chicago.

but who is not evidently sick, the best chance of obtaining an education and at the same time building his frail body into a strong and robust one. (In Lesson V, p. 99, may be found the answer to the question: In what cases will mere preventive measures suffice, and when does definite treatment of the disease become necessary?)

A Mistake to Force the Delicate Child Through School. Under no circumstances, should the delicate child be forced or hurried through school. All work and no play not only makes Jack a dull boy, but may so light up the smoldering fires of tuberculosis that years are passed by the anxious parents in bitter regret that they failed to look ahead a little, ere they see the flame extinguished. Is it not better that the little one start in a little late and lag behind somewhat, than that he be compelled to stop prematurely, and come out minus his health? Although knowledge is valuable indeed, yet a little less education means no serious loss; at all events there remains the chance that the loss may be made up when health is obtained. On the other hand, what is all the knowledge in the world worth to the child who is an invalid and cannot use it?

Vacation Time. The young tuberculosis prospect should spend his vacations in a comparatively quiet, easy life out of doors, entirely free from work* and study. Love of nature should be encouraged. A change of scene, a visit to the country, a camping trip or a leisurely tour in the auto, in which the youngster takes mainly a passive part, will often help to instil in his mind a love for the out-of-doors, and will do much toward making over the weak body.

* The elimination of child labor is one of the most important measures of prophylaxis. With the resistant forces of the body already naturally low, and the chance for acquiring relatively large doses of virulent tubercle germs unduly high (during childhood—as explained in Lesson II), to lessen the protective forces still further at this time through regular day labor should be considered a crime.

Again, a change of climate may be sought. (In some instances, removal to a healthier locality for an indefinite period is best. This point will be covered more fully in Lesson XII.)

The Danger of Overstudy. It is a strange truth that the boy or girl who is blessed by Nature with a strong body and who perhaps has an exceptional need for education, is often but a dilatory student; whereas the young man or young woman with body cast in delicate mold, veritably unfitted for the cramped and confining indoor life of the knowledge seeker, is ofttimes inclined toward excessive study. How many there are whose whole future has been warped and ruined by too much mental concentration during their high school or college years! Too often, the rather headstrong young man or young woman fails to take the cautionary word of advice seriously; yet in many cases parents can do much toward restraining a tendency to overstudy. Surely it is their duty to bring into play whatever influence they can exert in this respect.

Judicious Exercise Versus Violent Sports

Carefully Graded Exercise Sometimes Advantageous. There is no doubt that when wisely and moderately applied in appropriate cases, calisthenic or other carefully graduated exercises will quite often accomplish wonders toward strengthening and stiffening the physique. On the other hand, it is important for it to be understood that if the young person be already a victim of slumbering or of active, evident tuberculosis (which, perchance, may be unrecognized), it is not at all unlikely that such exercise, instituted with the hope of benefit, may serve only to fan the fire into leaping flame. For this reason, gymnastic exercises should not be taken up by persons thought to be merely predisposed except with exceeding

caution; and usually should not be undertaken at all except on the order of, and under the guidance of, an understanding physician.

The Hazards of Violent Sports. Violent sports, on the other hand, are to be decidedly frowned upon. I wish there could be blazoned forth a general warning against indulgence in strenuous athletic contests, more especially against those that call for a pronounced development of the "wind." These games and sports contain unseen perils for all, but are especially hazardous for those who are short on physical equipment. As a result of such unnatural activities, there takes place an overdevelopment of the heart and lungs. Sometimes the too heavy demand upon these organs results in an almost immediate breakdown. In other cases, nothing out of the ordinary is noticed at the time; at the end of the school or college years, however, when, as the young person settles down, the intense physical activities are suddenly dropped, the previously overstimulated organs are liable to degenerate. Too frequently "athlete's heart" or tuberculosis is the sequel.

Choice of Occupation

From a health standpoint, the essential guides in choosing a calling are that the labor be comparatively light, and that the work be carried on under sanitary conditions.

In keeping with these principles, the fact deserves emphasis that intense mental application may put a greater drain on one's resources than would a reasonable amount of physical labor. Thus, it is apparent that the quite common advice proffered to delicate persons to seek some vocation that requires mainly brain work, or to enter one of the professions, is sometimes based on error. True, such employment is exactly suited to some of these

individuals, especially to those who are peculiarly fitted through taste, talent, extraordinary opportunity, or the like, for one of the so-called learned callings. Yet the fact should be kept before one that the work connected with these vocations is not nearly so light as many suppose; and that, furthermore, the confining or irregular trend of life usually closely linked with work of this nature, plus the near-necessity for almost continual mental "digging," if one is to remain at all near the vanguard, unite to produce a heavy demand upon the capacities. If these observations are kept in mind, one will be less likely to make the mistake of selecting some occupation that calls for almost purely mental labor through basing the choice almost wholly on the assumption that such work is necessarily more healthful.

No universal rule can be laid down. The endeavor should be to take into account all related factors in each case, and let the decision be governed accordingly. In reaching a final conclusion, it should not be forgotten that, other things being equal, an outdoor occupation is best, and that, in connection with indoor work, the factors of light and ventilation and the question of dust or noxious fumes, etc., are among the important items to be weighed.

On Taking a Vacation

Every individual should include in his creed of living the fixed rule that, unless absolutely impossible, he will seek complete rest from work for not less than two weeks, at least once yearly. Everyone knows that one cannot continue indefinitely to run with the throttle wide open, without paying the price; yet how many attempt to do this very thing—ofttimes just to get ahead a little faster than the other fellow! Do not, then, allow yourself to become so engrossed in your work that you cannot once in

a while lift up the yoke and find relief in rest and recreation.

Habits

By adhering strictly to the principle of regular and moderate living, many a promising candidate for tuberculosis, tho additionally hampered by unhealthful working conditions, has succeeded in obtaining and maintaining vigorous health. He who cultivates the habit of promptness at meals, who observes a definite schedule for sleep, who makes sure that his bowels move at proper intervals (for the average individual, this means at least once daily), will be taking a long step toward health conservation.

All excesses should be avoided, the aim being to do nothing that noticeably or materially reduces strength. Along this line, a word of caution against dancing seems in order. The feeling of keen exhilaration that so commonly accompanies this form of recreation, has in many instances caused the dancer to overestimate his strength; until, led repeatedly to exceed his limit, he has gradually been carried along to his complete undoing.

The Use of Tobacco. Save from the standpoint of pastime or pleasure, it must be confessed that except in those less common cases in which the habit has obtained an almost unbreakable grip on one, or in other exceptional circumstances, the use of tobacco in any form serves no good purpose. Some men are never materially harmed by the moderate use of the weed; yet for others it is an insidious poison that directly or indirectly lays the foundation for disease. It is obvious, therefore, that those who wish to take advantage of every opportunity for guaranteeing health, will not contract the habit.

The Use of Alcohol. Far from fortifying one against tuberculosis, as some persons think, alcohol tends

to strip the body of its normal defensive power against disease. As a matter of fact the drink habit offers one of the easiest ways to acquire tuberculosis. Alcohol has met its Waterloo in this country and is tottering on its throne in other parts of the world, yet there may still be some persons who contemplate the salvation or redemption of health through drink. These should never forget the old saying that "Alcohol makes the bed of the consumptive."

Marriage and Tuberculosis

It has long been known that love and logic often fail to agree. It may very well be that a word of caution against the hasty assumption of the marriage obligation will in many instances fall on deaf ears. I have, however, an abiding conviction that there are many who wish to see clearly ere they leap; not alone for themselves, but that they may scan closely the future of the unborn. To these the following remarks are addressed:

A Matter That Should Be Looked Upon from All Sides. Marriage imposes an unusually heavy demand upon the wife and, to a less degree, upon the husband. For one who has shown symptoms of manifest (evident) tuberculosis, even tho only in the incipient stage, marriage is almost never to be seriously thought of until the disease has been firmly arrested for several years; even then, after apparent complete recovery, one should consider well before taking this step fraught with consequences of tremendous import. Bearing in mind the common sequel, conception,* the probable effect of such an event upon the health of the wife should be given due consideration. In addition, careful thought should be given to the following questions:—

* To the suggestion that one marry and give up all thought of having children, the answer is: No; for a pregnancy is very likely to occur despite all intentions to the contrary. *To cherish the belief that it will not is a serious mistake that may lead to intense regret.*

Has one the right to enter a relationship that one knows will probably result in bringing into the world a being already weakened, and liable to be unfairly smitten near the very beginning of its career? Is not the heritage of a strong body due every child? Is it not the duty of those who think of marriage to weigh thoroughly the consequences ere they assume an obligation that may rob the most precious possession of the home in the enjoyment of this right?

The Risks of Pregnancy. In the first place it should be thoroughly understood that for tuberculous persons the sexual act, and particularly sexual excess, have distinct and decided dangers of their own. These will be fully discussed in Lesson VIII. Yet there are other things even more important for those having marriage in view to understand. It should be stamped indelibly upon the forefront of the memory that childbirth, especially if repeated, and the nursing and rearing of the little ones, put an extraordinary and very severe strain on the tuberculous mother. The old belief that the bearing of children was a cure for consumption, has under the torch of experience and knowledge given way to the understanding that **childbirth and the care of the newcomer more often breed tuberculosis.** The hazard is as a rule greater during the first few years of married life, or until the wife has become thoroughly accustomed to her new duties—and in some cases, trials—and until the circumstances of the couple have become fairly easy.

After all, no one rule will apply to all cases. Whether the conclusion be based mainly on the molding of one's children's future, or on one's own welfare, in the end the settling of the matter often depends partly on other considerations, among which the state of one's finances, the temperament of both parties, and the willingness to make self-denial and sacrifice for the good of one's mate, are important factors.

. Momentous Question. On the other hand, when oman already pregnant discovers that she has tuber-sis, she should receive the greatest sympathy and sideration. It may comfort her to know that the does not forbid the premature interruption of gnancy to preserve life, tho a matter of such im-t can be decided only after the most earnest and mn thought on the part of the married couple in junction with their spiritual and medical advisers.

hould pregnancy continue, every means that may ten the burden of the expectant mother should be loyed. At the time of childbirth an anesthetic uld be given or "twilight sleep" induced, and the la-terminated by artificial means as soon as advisable.

sick mother should not nurse the infant, she should elieved of its care, and it should be kept away from sick persons.

Precautions for the Sick

eed for Extra Precautions Under Certain Circum-ces. In all cases the person ill of tuberculosis uld make use of every known method of safeguarding health of others, but precautions are even more es-ial under certain circumstances. Altho, as previously d, tuberculosis is not usually contracted during adult , yet owing to the continual and intimate character he relationship that exists between husband and wife, ne or the other be afflicted with tuberculosis, the nce that one's mate will acquire the disease is con-rable, if reasonable precautions be neglected. In cases, and when there are children in the home or the sick person, all measures should be applied with aordinary thoroughness.

eneral Rules. The patient should sleep alone, pref-ly in a separate room, which in suitable cases may

be quite distant from the general living or sleeping quarters; at all events no well person should sleep within four feet of the sick. Kissing or fondling should not be indulged in; and the ill person should avoid handling the food of others. Towels, napkins, drinking cups, and the like, should be kept aside for the sole use of the invalid. Separate tableware may also be used for the sick. If this plan is not followed, after thorough washing all dishes should be boiled, or at least well scalded.

The afflicted person should be careful not to cough or sneeze into the face of others. A cloth or a paper napkin may be held in front of the face when coughing; but this is almost useless unless the cloth or paper be properly disposed of immediately (by burning or placing in a suitable receptacle), ere it contaminates the body or clothing. The hands should be washed frequently.

Beards, mustaches, and veils are efficient germ collectors, and should therefore not be worn.

Care of the Sputum a Matter of Vital Importance. For his own protection, the invalid should never knowingly swallow even the smallest particle of his sputum. (It is evident, however, that those who have much expectoration are very likely to swallow a certain amount of the sputum while asleep. Ordinarily, this is destroyed by Nature or passed out in the bowel dejecta, without harm resulting. There is, therefore, no cause for alarm if a small amount of sputum is inadvertently swallowed at other times. Nevertheless, swallowed sputum is not always harmless, so it should on no account be swallowed voluntarily.) On the other hand, promiscuous expectoration is not to be tolerated. If at any time exigency makes impossible the proper disposal of this dangerous discharge, on no account should one spit indoors upon the floor. If, perforce, one must spit elsewhere than in

a suitable receptacle, let one do so in the street in a sunny spot where the solar rays will be given fair opportunity to destroy the germs; not in a dark alleyway, or down some grating or crack, inaccessible to the sun. The habit of spitting in handkerchiefs is both disgusting and dangerous. Those who are confined to bed should use exceeding care that they do not soil the bed clothing.

Practicable Methods of Sputum Disposal. It should be understood that one is not properly protecting the interests of others by merely expectorating in the public spittoon or large sawdust containing spit-box. This is not enough. The sputum should preferably be collected in some form of individual sputum cups; and subsequently destroyed **before it has had time to dry and be blown about.**

The sputum cup made of specially treated heavy paper, which fits into a metal holding flrame, is cheap, and is perhaps the most satisfactory receptacle for ordinary use. Patients who are up and about, may provide themselves with a supply of the collapsible, pocket paper sputum collectors. These cups, obtainable at little cost, answer the purpose very well, provided each is used only a few times. A small pledget of cotton placed in the bottom, helps to absorb and retain the discharge. There are several other forms of pocket sputum retainers on the market, some of metal, that are also safe; as an alternative, one of these may be used if so desired.

How the Sputum May Be Destroyed. All receptacles should be protected from flies, and their contents promptly destroyed. Paper cups should be burned. Care should be taken to make sure that the contents are completely incinerated. If sawdust be sprinkled into the cup occasionally, as it is used, burning will be facilitated. Merely bringing the sputum in the cup to the boiling point is not sufficient (to destroy all the germs,

altho of course this kills many and weakens others); if, however, boiling be continued for thirty minutes, the process may be thoroughly relied upon.

Chemical methods are less certain than fire or heat, but may be used for metal or similar containers. A two per cent solution of either Lysol or chloride of lime; a five per cent solution of carbolic acid; or a 1:1000 solution of corrosive sublimate (preferably incorporated with other ingredients as in the commercial Bernay's antiseptic tablets) are among the best agents for this work. NOTE: If convenient, the cup may be kept partly filled with the solution; but at all events the solution should be in large excess over the expectorated matter, and should be allowed to remain in contact with it for twenty-four hours before emptying.*

Importance of Destroying All Discharges. The sputum is the greatest source of danger, and in many cases the only source; yet in some instances, discharges of other character may similarly threaten the health of others. When there is reason to suspect that any other excretion or discharge holds a menace, its virulence should be destroyed by one of the methods just described.

CARE OF THE APARTMENTS

An abundance of light and fresh air should be constantly admitted to the rooms occupied at any time by the sick. In cleaning the apartments the vacuum cleaner or moist-sweeping, and the collection of dust with a damp

* In the disposal of the sputum care should be used to avoid contamination of any open sore or cut. Local tuberculosis of the fingers from accidental inoculation is not very rare among butchers, and among physicians who do very much post mortem work, and while under ordinary circumstances the chance of acquiring an infection in this manner is not large yet cases of this sort have resulted in fatal general tuberculosis. In childhood, owing to the fact that the child often plays on the floor where germs settle, the chances of a wound on the hand being inoculated is increased, and at this time of life the results are likely to be serious, facts which should serve as additional warnings against careless methods in disposing of the sputum.

n or oil-mop, are much to be preferred to the older, m-sweeping, dust-scattering methods.

umigation Versus Simpler Methods of Disinfection. en the premises are vacated, before the rooms are pied by other persons, they and their contents should horoughly disinfected. For this purpose, if the re- able articles that are most liable to be contaminated, as the bed linen and covering, be boiled or burned, roves practicable in each instance; if the woodwork the like be thoroughly scrubbed with soap and hot er; if the rooms be well aired and sunned for several s—this process will probably be more effective than igation alone, and is certainly far more trustworthy is the hit or miss plan of fumigation commonly in ne in the past. However, if fumigation be properly e, it is perhaps needless to add that the habitation be safer than if only the simpler cleansing plan is wed.

fumigation is decided upon, in order that the dis- ction may be complete, it should be attended to by, arried out under, the direction of the health authori- or some one who thoroughly understands the matter. satisfactory fumigation, it is a prime requisite that rooms be unoccupied and that all cracks and open- be so sealed as to render the apartments practically ight. If this cannot be done, efforts at disinfection hemical means are to be looked upon as largely a e of time. For the disinfection of open-air sleeping hes unprovided with means of temporary closure, efore, the simpler and more natural agencies above ribed must be the main reliance.

Preventive Vaccination

has long been the fond hope of workers in the field berculosis to perfect an effective preventive vaccine,

and within the last few years a number of preparations devised for this purpose have been brought forward. It is hardly probable that at any time a preparation of this nature will be perfected to the point of conferring absolute or complete protection against tuberculosis—against massive germ dosage—or that a single vaccination or one course of inoculations will afford protection throughout life; but if protection is secured during the earlier years of life a great stride forward will be recorded. Sufficient time has not elapsed for the accurate evaluation of the vaccines now in use, but there are several such preparations which can be given with safety and with some ground for the belief that a degree of protection, however slight it may be, will be obtained.

The Periodical Health Examination

Altho, strictly speaking, any step that is taken for the detection of ill-health cannot be reckoned as a truly preventive measure as applied to the individual case, nevertheless, the periodic health examination is an extremely powerful weapon in the control of tuberculosis.

There is no doubt that, if generally adopted, the plan of putting ourselves into the hands of capable physicians once or twice yearly for a thorough going over from tip to toe, would lead to the recognition of many unsuspected cases of tuberculosis. This procedure is now receiving widespread commendation; and in both the interest of their policy holders and themselves, it is being advocated by many insurance companies, who appreciate that it is one of the strongest policies that one can take out. Isn't it just as easy to do this as it is to have one's teeth examined at regular intervals? Those who are conscious that there is something holding them down, keeping them always behind in the swirl of life and affairs, may by periodically taking this simple precaution, start the

els moving that will permanently remove the handi-
. Why not make systematic examination of the whole
y now and then a habit, and thereby mayhap save
ne's self years of usefulness?

LESSON IV

IF THE CHEST HAD A WINDOW

If one could look into the body affected with tuberculosis, one would obtain a clearer insight into its nature, which would make it easier to interpret the signs that lead to its detection, and to grapple with the problem of retrieving health. With this idea in mind, the following paragraphs have been written in an effort to describe in non-technical language the structural alterations produced by tuberculosis of the lungs.

How Different from the Healthy Lungs!

Were it thus possible to glance into the chest of the sufferer from tuberculosis, the picture would be quite different from the view gained on looking into the body of a well person. Instead of seeing, as in health, two delicate, light and spongy, gray or pinkish lungs, swinging easily and freely, and expanding and contracting evenly, as each breath is taken, the breathing organs now seen have an entirely different aspect. The top part, or perhaps some other part of one or both lungs, is seen to have changed into a rather solid and more or less soggy mass of a general darkish color; which, if picked up and compressed, no longer gives an airy and cotton-like feel to the touch. On the contrary, the affected portion is decidedly hard and almost solid, much like liver in consistency—a condition which long ago gave rise to the old term "consolidation of the lungs" as a synonym for tuberculosis.

Evidences and Results of Nature's Handiwork for Repair and Compensation. The affected areas of the lungs, and in some cases other parts of these organs, are perhaps found to be covered with a thick, dense layer of tissue (thickened pleura). Then, too, in places the lungs are seen to be united to the chest wall by either delicate or firm bands, likewise formed of new tissue (pleural adhesions) which hold the diseased portions almost stationary, so that they barely move at all. Odd as it may seem, these incrustations or thickenings, and adhesions, are, in some degree at least, manifestations of Nature's efforts to prevent the spread of the disease and to repair past damage. Being bound down and prohibited to a greater or less degree from functioning, the disease areas are given rest and a better chance for healing.

Here and there certain neighboring parts of the lungs unaffected by the disease are seen to have become stiff, and, for the present at any rate, functionally useless. (This is due to the cutting off of the air supply by disease, scars, and the like.) On the other hand, still other nearby sections of the lungs, especially those a little more distant from the focus of disease, are rather enlarged and overdistended with air, as if Nature were trying to compensate for the "putting out of business" of one part of her air laboratory by having the other parts do extra duty.

Effect on Other Organs. On looking further it is discovered that the damage has not been confined to the lungs alone; for it is seen that in one way or another, the functioning of nearby organs has also been interfered with. For example, one notices some peculiar effects resulting from the subsequent contractions of the pleural incrustations and bands just described, and to the shrinking of scars formed in the lungs as a result of

healing, as well as to the crowding effect of the enlargement of the healthier air cells from taking on increased duty. Thus the large blood vessels that enter and emerge from the lungs and heart may be bent and distorted; and the heart, itself perhaps soft and flabby, may be cramped, and even pulled or shoved quite out of its ordinary position. On the whole, the normal relationship of the chest organs may be considerably disarranged.

A "Close-up" View. If one of the solid areas in the lung is inspected still more closely, it is observed that the surface is punctuated by a number of dots or islands of pearly white—little globular lumps or nodules, projecting slightly above the surface, which vary in size from a pin head to a marble. Each nodule represents a colony of the germs of tuberculosis surrounded and hedged in by a wall of Nature's protective cells assembled at the spot to combat the germs. These lumps have been named *tubercles*, a term that has come down through the centuries, and which is said to have originated from the likeness these small masses bear to an ancient unit of measure or weight.

If a cut be made into the lung, similar dots or masses of white are found scattered throughout the substance of the organ, while between the tubercles the tissue is rather red and swollen, as in an ordinary inflammation.

Similarity Between Tubercles and Boils. If the development and evolution of a number of tubercles could be followed throughout their complete course, there would be seen a rather striking resemblance between this process and the "ripening" and subsequent discharge of the "cores" of a group of boils. In this comparison, however, one outstanding point of difference would be noticed: *the transitions undergone by the tubercles take place much more gradually.*

Thus it comes about that as the disease progresses the tubercles grow larger and larger until, after a time, some of them begin to soften. This process usually commences in the center of the nodules, but often extends outward until the entire mass has taken on a decidedly mushy or cheesy character. By extension the softening process may also include some of the healthier lung tissue beyond the limitations of the tubercle proper. Sooner or later, individual tubercles unite, forming masses the size of peas, marbles or larger. Meanwhile the breaking down or softening of the tubercles continues, until in time the pulpy, cheesy masses in turn change to a thick liquid.

As a rule, the softening process eventually opens a way into a bronchial tube (or the tubercles may have originally developed in the walls of the smaller bronchial tubes and in their growth subsequently have invaded the lung); whereupon the semiliquid material is coughed up and discharged as sputum. This breaking down process may through periodic extension involve quite a large area, so that when the centers of the neighboring masses are completely evacuated, only very thin walled partitions separate the holes in the lung—called cavities—that remain, one from the other. It is probable that these intervening walls will sooner or later give way, when the individual cavities combine to form one, in this manner finally producing quite a large excavation.

What Is Meant by "Open" Tuberculosis and "Closed" Tuberculosis? Before proceeding further, it seems advisable to call attention to the fact that not all tubercles go on to the stage of softening. Under certain circumstances tubercles may be present in the lungs, yet may not for a long time, perhaps never, "ripen." Again, even tho softening has taken place, the destructive process may fail to open a passageway

into a bronchial tube. In both of these cases, as no outlet is given to the discharge, the condition is spoken of as "closed" tuberculosis. In some instances, the disease always remains of this type. The point of importance in this connection is that **persons suffering from "closed" tuberculosis cannot give the disease to others.**

On the other hand, if the destructive process has broken through into a bronchial tube, because an avenue has thus been provided for the discharge of the poisonous matter from the body, this is in one way favorable to the future health of the individual. However, such a patient, unless careful in the disposal of his sputum, becomes a distinct menace to those near him.

So, too, it may readily be seen that when the disease is still of the "closed" type, the poison pent up in the lungs may produce serious results; yet it may be quite difficult for even the most expert physician to recognize the real cause of the illness. For of course, in such cases, the germs cannot be found in the sputum, altho they may be numerous indeed within the lungs.

How the Tubercle Appears Under the Microscope

Tubercle Comprises Nature's Fighting Cells Hemming in the Germs. If one of the small, firm, more or less spherical tubercles be examined under a high-powered lens, it is seen to consist of a nest of cells, in and between which the germs of tuberculosis are found in greater or less number. The cells composing the tubercle are of two main varieties: (1) Especially near the center of the nodule, are amassed a considerable number of large irregular-shaped cells, which have apparently originated from the stationary or fixed cells of the neighborhood by a process of rapid multiplication. (2) Intermixed with the cells just described, but found even in larger num-

bers near the periphery of the tubercle, are many small round cells very similar to, if not identical with, certain varieties of the white corpuscles of the blood (lymphocytes). The point of interest in connection with these cells of various kinds is that they are all a part of Nature's army of fighters—the soldiers of the body—which have either been manufactured on the spot or assembled at the danger point and pitted against the invading army of germs. Here they may succeed in destroying the germs; or at any rate will probably be able to hold the invaders in check temporarily.

Subsequent Course of the Tubercle. If the defenses prove adequate, the tubercle may not progress beyond the minute, firm, pearly stage. Thus, in time, the germs are killed or eliminated; Nature then removes her army of cells, so that very little, if any, effects of the invasion remain. Such a clean-cut victory is obtained only when the tubercles are very small.

On the other hand, if the enemy army acquires control of the situation, many of Nature's soldier cells are killed by poisons set free from the germs. At the same time, these concentrated poisons seep out into the surrounding healthier tissues, injuring or destroying the delicate fabric of the lung and preparing the way for further advance of the disease.

In still other instances, though Nature's forces prove unequal to the task of completely routing the germs, the germs likewise fail to gain a decisive victory over the protective forces of the body. In such cases a truce is declared, and the tubercles may remain for months or years with no material change—latent tuberculosis. During this period of dormancy, the afflicted person experiences little or no ill effect. None the less, **the presence of latent tuberculosis is a distinct threat to health and safety, because at any time some circum-**

stance may intervene that will strike flame to the smoldering fire.

"Mixed Infection"

By the time that softening of the tubercles has taken place, and in some cases earlier or even from the outset, other germs than the tubercle bacilli have usually found their way into the air passages and, finding within the lungs a receptive soil, have joined the tubercle bacilli in a combined battle against Nature. This association of several varieties of germs—or the engrafting of one disease upon another—is spoken of as a "mixed infection." In the olden days, when as a rule tuberculosis was not recognized until marked wasting of the tissues of the body had occurred, mixed infection had practically always already taken place. Let it be understood, then, that once the disease has progressed to the stage when the term "consumption" can be literally applied, a mixed infection is virtually always present. Among the germs commonly found in mixed infection are those which ordinarily produce pneumonia and boils, as well as others that are closely akin to the germs of erysipelas; those that apparently play a part in the production of la grippe (influenza); and those that in the ordinary course of events are responsible for "colds."

Kindred Diseases

In certain occasional instances, some of the germs just listed or still others gain entrance to the breathing passages, unaccompanied by and without the previous presence of the germs of tuberculosis. Yet these other germs bring about a chronic inflammation or consolidation of the lungs similar to that caused by the tubercle bacilli. Included in this group of germs producing diseased conditions closely resembling genuine tuberculosis, in





HOW TUBERCULOSIS BEGINS

Above, diagrammatic view of normal lungs. In lower drawing the small rounded masses represent tubercles, while between the tubercles the tissue is inflamed and hardened to a liver-like consistency. In the left lung some of the tubercles have softened and been expectorated, leaving a cavity.



addition to those above mentioned, are (less commonly): those organisms that ordinarily produce "lumpy jaw" (actinomycosis) in cattle (and also a group of closely related germs—one of which is called streptothrix), the germs of syphilis, and a related germ sometimes called Castellini's spirochete.

It is well for it to be realized that in each of these allied ailments not only the picture of disease in the lung closely imitates tuberculosis, but the outward evidence of these various ills—that is to say, their symptoms—are also not rarely with difficulty distinguished from those produced by real tuberculosis.

A Troublesome Question Answered. Patients sometimes feel much concern if any doubt exists as to whether their illness is caused by pure tuberculosis, or whether it is due to a mixed infection. Likewise, since there is the possibility that the sickness may be caused solely by one or more of the allied diseases simulating tuberculosis, the afflicted person is sometimes quite unsettled as to whether or not he is getting the proper treatment. He may also have doubt as to whether continued adherence to the program that has been mapped out for him is necessary. Here, then, let it be pointed out that these various diseases, including (1) unadulterated tuberculosis, (2) mixed infection, and (3) the chronic lung conditions caused wholly by one or more varieties of germs other than the tubercle bacilli, are all serious. All may terminate in "consumption"; that is to say, in marked loss of flesh, and death. All, in the present state of medical knowledge, require essentially the same general, or natural, methods of treatment or management. At any time a remedy with a strong curative action against the tubercle bacillus alone, or against one or several of the other germs alone, may be brought forth, but until such a remedy actually comes to the fore

it does not make a great deal of difference which germ or germs must shoulder the blame in the particular case.*

Scientific Accuracy versus Practical Efficiency. In all cases, for the sake of scientific accuracy and also to the end that no measure offering even small opportunity of benefit to his patient may be neglected, the physician will make every effort to separate the conditions, and to bring to light the exact germ or germs responsible in the given case. But if in spite of his best efforts the physician fails in this endeavor (as sometimes even the most expert physician will fail), no alarm need be felt. **When in doubt, the only safe rule is to regard the condition as tuberculosis until proved otherwise, and to apply with vigor and persistence the measures known to be useful in this disease.**

"Miners' Consumption"

That peculiar ailment known as "Miners' Consumption" is another rather intimately related and interesting condition accompanied by hardening or solidifying of the lungs. In this disease the continual irritation set up through the breathing in of foreign particles of stone, coal, ore or the like, in the form of fine dust, results in the gradual development of extensive areas of inflammation within the lungs—a process that terminates in a widespread overgrowth of scar tissue throughout these organs, which gives rise to symptoms almost identical with those caused by the tubercle bacilli. In respect to this malady the most significant feature is that the dis-

* However, it is especially important that syphilis of the lung, or actinomycosis or related diseases be recognized, as specific remedies of value have long been at hand for these conditions. This is especially true as regards syphilis, which, however, attacks the lungs but rarely. Fortunately, too, actinomycosis seldom occurs in man. Vaccines and sera are now being employed against many of the germs frequently present in mixed or allied infections, with some benefit. Nevertheless, the chief curative treatment of all of these ailments, when chronic and resembling tuberculosis, coincides in all important particulars with the treatment or management of pure, or genuine, tuberculosis.

ease is not caused by a germ. Hence, pure "Miners' Consumption" offers no danger to other persons. It is true, however, that in some instances the germs of tuberculosis later find lodgment in the inflamed tissues; in this event, actual tuberculosis may develop. On the other hand, some observers believe that "Miners' Consumption" in some manner provides the body with a certain amount of protection—which is, to be sure, incomplete—against true tuberculosis.

Manner in Which Tuberculosis Impairs Health

As previously indicated, the tubercles have a prejudicial effect on health in a number of ways, which will now be summed up and noted a little more carefully.

1. The effect of poisons seeping out from the focus of disease

How the Poisons Originate in Three Ways. During the course of tuberculosis, especially when the disease is extending rather rapidly, poisons are constantly escaping into the blood stream, whence they are distributed widely throughout the body. To a greater or less extent, then, every organ and part is made to feel the influence of the disease.

These poisons take their origin from at least three different sources: (a) They are set free from the tubercle germs. (b) They are set free from other germs—the germs of mixed infection (just described). (c) They are produced as a result of the death and decay of the cells composing the tubercle and the surrounding tissue—a destruction that takes place just to the extent that the germs overmaster Nature's defense.

Fever Indicates Nature Is Fighting: How One Sometimes Grows Worse in Order to Get Better. In regard to the poisons derived from the tubercle germs, it

may be recorded that, **paradoxical as it may seem, these poisons are only in small amount cast off from the germs so long as they are alive.** (To a limited degree this is also true of the poisons taking their source from the other germs mentioned.) It is only as the bodies of the dead germs disintegrate, that the poisons are liberated in large quantity. In other words, the setting free of poisonous material from the decaying bodies of the germs often **has a tendency to cause the patient to seem worse at the very time that he is—in a way—really taking a step toward recovery.**

From this it is learned that the little rises in fever prone to occur during the disease should not be taken too seriously. To be sure, every practicable measure for giving the patient additional support while passing through the little stormy period should be employed. But merely because for a few days, a few weeks, or even longer, the fever is a little higher, it need not be felt that one is necessarily on a downward course. As a matter of fact, the defensive forces of the body may have just succeeded in putting a goodly number of the germs "out of the running";* when the effect of this fresh dose of poison has spent itself, the fever and associated ill feel-

* This, of course, implies that the body has been called upon to put up a more vigorous fight. (Hence the importance of conserving the energy so that Nature may be "backed up" in every way possible at this time. This means Rest, spelled with a capital R.) Doubtless some may wonder whether the necessity for putting up a harder fight has not come about in turn solely because the germs had already begun to multiply more rapidly. "If this is true," such a patient may argue, "even tho fever is an indication that the germs are being killed, am I really the gainer?" Here is the answer: In some cases it is a fact that the sequence of events is exactly as this patient surmised. Whether or not in such a case the sufferer will actually benefit in the end, depends on just how strong the fight the defensive forces of the body wage—just how much they are stimulated in their struggle with the germs.

In other cases, however, repeated studies have shown that, oddly enough, Nature is inclined to make periodical spurts in her endeavor to overcome the germ invaders, irrespective of whether or not she has been incited to more vigorous efforts by renewed onslaughts of her microscopic enemies. In many such instances the net result of each of these up-waves in the fever (and perhaps other symptoms) is a step forward in the healing process.

ings will subside. With some of the germs thus forever eliminated from the combat, as soon as the defensive forces have had time to recoup their losses, strength and cheer will probably be regained. Once having successfully weathered the little storm, the invalid is often fairly surprised to find himself just so much nearer the goal; and so sees there is good reason for increased hope and encouragement.

2. WIDESPREAD RESULTS BROUGHT ABOUT THROUGH THE BODY'S TELEGRAPH SYSTEM

It may be surmised that as the disease advances, the sensitive nerve fibers within the reach of the destructive process will be destroyed or seriously injured, giving rise to pain and to interference with the function of the lungs. More surprising, however, is the fact that misleading disturbances of organs quite distant from the focus of infection are often brought about via the body's telegraph wires—the nervous system.

How the Nervous System Controls the Body's Workshop. Here it may be well to recall that the nervous system consists of an intricate arrangement of nerves radiating out from the brain and spinal cord, with terminals reaching every organ and recess of the body. By means of these interlacing telegraph wires the movements of each muscle and part are controlled, and the action of the various organs regulated in a harmonious manner in accordance with the needs of the body as a whole. In response to messages coming in to the centralized points of control—the brain and spinal cord—orders are instantly flashed out, directing a certain organ to "speed up," or, as the case may be, to "ease down," a little in its work.

The Lungs Merely One Terminal on a "Party Line." If it is remembered that one of the most important nerves

of the lungs (called the vagus nerve) also sends branches to many other organs, including the throat, the voice box, the heart, the stomach and intestines, the liver, the ear, etc.; and if it is further recalled that this nerve of many branches is but a single link in the immense network of nerves with antennae reaching to the body's innermost niches, one will perceive how easy it is for messages of distress originating in the lungs to go astray and (like the miscarrying of messages over a telephone system when the "wires are crossed") give the impression that the call for aid or relief came from other, perhaps distant regions of the body. So, too, it is readily seen how, in response to these urgent signals, entirely misdirected despatches may occasionally be sent out from the brain or spinal cord—despatches which likewise go far wide of their proper destination, causing organs for which they were not intended to slow down or speed up in work.

An Odd State of Affairs with Both Good and Bad Features. Here it is necessary to pause a minute, while a word of explanation is given. Strange to relate, the lung *substance* is one of the few portions of the body almost entirely unequipped with nerves capable of conveying painful sensations. On the other hand, the pleura (the lining covering the surface of the lungs and the inner surface of the chest wall) is richly supplied with many highly sensitive nerve filaments. Whether this odd arrangement is due to an oversight on Nature's part, or whether it is an evidence of her foresight and wisdom, with the intention of avoiding trouble, is yet in doubt. Be that as it may, the comparative scarcity of such nerves in the lungs has been as a soothing balm to many a sufferer, and on the other hand has sometimes worked greatly to his disadvantage.

The well known observation that persons afflicted with tuberculosis seldom suffer from severe pain in the lungs is

thus accounted for. Thus far, the scanty supply of sensory nerves may be regarded as a blessing indeed. Unfortunately, however, this relative freedom from pain which, if it had been present, or had been a more prominent feature, would have served to direct the invalid's attention to his illness at a much earlier period, has been the explanation of many a tardy diagnosis.

How Pain Is Often Referred to the Surface of the Lungs. It goes without saying that the foregoing statements are not meant to give the impression that pain *never* occurs in tuberculosis. Rather, they are intended merely to indicate that when pain is present it is usually of a moderate character, and that it is often referred to the surface of the lung or elsewhere (reflex, referred, or sympathetic pain). By way of illustration, it may be explained that pain is often absent or of quite mild character until the disease approaches that portion of the lung just beneath the pleural covering. On the contrary, now and then a case occurs in which from the outset a superficial area of the lung has been affected, so pain has been more marked from the very first. In both of these instances pain may be an outstanding feature, and in fact, a small focus of disease near the pleura may cause an amount of pain quite disproportionate to the size of the area involved.

Healing Pains. In other cases, contradictory as it may sound, pain is negligible or entirely absent until the patient is well on the mend. Thus, even tho early in the disease a large section of the lung may have been destroyed, there may have been little pain because few nerves adapted to the conduction of messages of pain were injured. Later, after healing has begun and as the newly formed healing tissue becomes set into firm scars, which gradually shrink and harden more and more—the few nerve fibers within the grasp of these

scars are sharply pinched, so even these relatively lethargic fibers are awakened into a comparatively acute outcry of pain.

Moreover, as the scars become smaller they exert a pulling effect on the neighboring tissue and indirectly make traction on, and dimple-in, the surface of the lung. Thus, through drawing on the intervening tissue, the more sensitive nerve filaments located in the pleura and at other places fairly distant from the actual seat of trouble, are irritated. As a result, the strange phenomena of peculiar drawing sensations and *healing pains* are brought about.

Shoulder and Arm Pains. Delving a little deeper, we recall that under ordinary circumstances we are wholly unaware that the chest is a busy workshop, and go our daily ways entirely unconscious of sensation of any kind within us. Now, if it be remembered that during tuberculosis wholly new impulses are initiated within the chest, we see how easy it is for the great central controlling telegraph station of the body (the brain and spinal cord) to erroneously assume that these new messages come from one of the more ordinary sending stations. That is to say—from a part of the body from which the patient has been accustomed to receiving painful impressions; which ordinarily means from some superficial area. As a matter of fact, the chance of the sidetracking of the messages is made even greater by the peculiar anatomical linking up of certain superficial nerves of the body with those supplying the lungs. In this connection, the significant item is that the nerves distributing to the lungs branch off from the main nerve trunks near the point where the nerves that supply the skin and muscles of the chest, shoulders, neck and arms, take their origin.

This odd arrangement of the body's telegraph wires

is, then, the explanation of a large number of the divers aches and indefinite pains occurring in the course of tuberculosis. For example, the tired feelings, which sometimes amount to actual pain or aches, usually of a mild character, over the chest, in the shoulders, neck and arms, which are fairly common in tuberculosis, and are often mistakenly ascribed to rheumatism, to catching cold or to some other like influence, are in many instances really brought about in this manner.

It is but natural to assume that as a result of the disease within the chest, actual inflammation would occasionally be set up in some nearby nerve. It may further be surmised that the inflammation would tend to extend along the nerve toward, and perhaps clear to, its origin from the parent nerve trunk. One would also suppose that if the inflammation continued to spread along the nerve trunk, as it came to the point where the nerves running to the exterior parts of the body branch off, these likewise would become inflamed. In very truth, this is not rarely the case; and the inflammation of the superficial nerves (neuritis) thus produced, furnishes yet another explanation of some of the perplexing pains in the arm, the neck and other parts, which are sometimes a prominent feature of tuberculosis, either during its course or as healing sets in.

Influence of Weather on Pain. Persons suffering from tuberculosis often state that on certain days they feel pain more keenly than at other times. Likewise, physicians who have a large number of patients under their care frequently notice that when the weather undergoes a change, a great many of their patients have their attention directed to pain for the first time, or complain that former pains are exaggerated during this period. Furthermore, persons who have previously sustained injury elsewhere on the body not rarely remark that long-

standing scars are apt to become more tender and sensitive on such days.

Nor is it by any means always the cold and damp days on which groups of patients thus bear one another company in distress. At one time, for example, the weather is cold and damp, yet at another (though less commonly) it is hot and dry. Evidently there is some unrecognized influence at work, but whatever the exact atmospheric change responsible, it can readily be seen how the alteration of the blood supply to the diseased areas or to long-forgotten wounds and scars may cause congestion and swelling, which in turn lead to pressure upon the nerves, thereby calling attention to the old trouble once more.

3. MECHANICAL DISTURBANCES

The mechanical disturbances occasioned by the contraction of the scars in the lungs and by the encroachment of the relatively sound portions of these organs, as they enlarge, all tend to cause a displacement of the neighboring organs and to hinder them in the performance of their duties. This is especially true of the heart.

4. INTERFERENCE WITH THE HEART MEANS GENERAL BODILY INEFFICIENCY

As each of these influences (numbered 1, 2, and 3) affect the heart to a greater or less degree, in turn interfering with the supplying of nutriment to, and carrying away of impurities from, each bodily cell, it is evident that here is yet another way whereby deceptive derangements of other organs may be produced.

This list of the various routes and means by which false clues may be produced, might be extended still more, but these will suffice to make clear that it is necessary for one who is suffering from disturbances that may by any possibility be due to tuberculosis, to be sharply on his guard.

LESSON V

HOW TUBERCULOSIS MAY BE RECOGNIZED

THIS lesson is an effort to keep the reader on guard against tuberculosis and to point out the chief signs and means by which tuberculosis may be detected, so that the suspicions may be aroused in time and a physician skilled in dealing with tuberculosis consulted promptly.

Preconceived Ideas Should Be Laid Aside. Almost everyone recognizes the death-like pallor, the sunken and perhaps flushed cheeks, the pinched features and the haggard expression, of the victim of advanced tuberculosis, who slowly drags his wasted form about, his course now and then checked by a spasm of coughing which racks his frail body and causes his face to distort with pain. Altho it is often possible for one to put up a winning fight even after the disease has progressed thus far—to the stage of *consumption*—it is necessary for one to lay aside this picture as representing early or moderately advanced tuberculosis—the stage in which the disease should be recognized if the sufferer is to be given his due chance for victory. The fact should be impressed on the mind that far from *seeming* seriously ill, *the person afflicted with early tuberculosis usually appears entirely well.** (Case No. 5, later in this lesson, will serve fairly well to illustrate this point.)

What Cases of Tuberculosis Require Recognition and

* Conversely, an individual will now and then be met who has all the outward appearances of advanced tuberculosis, yet who really is entirely free of this trouble, and in fact is suffering from some wholly different ailment. This merely furnishes additional proof of the truth of the time-worn saying that appearances are deceitful.

Treatment? When considering the means for recognizing tuberculosis, there comes to mind the question: **Is a mere trace of tuberculosis a sufficiently serious menace to necessitate treatment?** The answer is: *As a rule, No;* because a trace of tuberculosis has no material effect on health and because the process will in the majority of cases advance no further. Careful investigations have disclosed the fact that in civilized countries approximately seventy-five per cent of the children have acquired *in some part of the body* at least a trace of tuberculous infection by the time they have reached the age of fifteen; and that roughly ninety per cent of civilized persons harbor at least a slight infection *during some part of the life span.* When a safe and easily administered remedy, effective in a few doses, is produced, it will be advisable to apply the treatment generally; but with present methods active treatment of everyone who is only "a little bit tuberculous" is neither feasible nor necessary.

The presence of a trace of tuberculosis can be detected only by the expert physician. When this condition is discovered, it is perhaps well for the individual to be informed of the fact. Or, what is more important, if detected in childhood, the condition should be explained to the parents in order that they may shield the child from undue strain and keep on the watch for any evidence pointing to an advance of the trouble. In these instances the protective measures described in Lesson III may be applied. Only exceptionally is definite treatment called for in this group of cases.

When Symptoms Are Produced Treatment of Tuberculosis Is Imperative. The further question arises: What cases of tuberculosis require treatment? Whenever the well-being of the individual is influenced in any manner—that is, **when symptoms occur—treatment is**

y called for; if the symptoms have recently be-
ore noticeable, the urgency is greater.* Ex-
has demonstrated time and again that when
tion has developed to this degree, that is to say,
has resulted in *disease,* as ordinarily understood
or *clinical* tuberculosis), the condition is always
and if allowed to drift along without being com-
ill, in by far the greater number of cases, sooner
continue to progress. If the disease is limited in
nd has caused only a few symptoms, it is spoken
ipient or *first-stage* tuberculosis (the mere *trace*
ion not being considered); and it should be
od that **incipient clinical tuberculosis is**
serious matter.

lition to those cases that show symptoms, treat-
sometimes required for other reasons. For
now and then a case occurs in which, although
evidences (symptoms) are lacking, a large area
e is present. These cases also demand treatment,
hey embrace only a small group, and can be
d only by the expert, they need not be further
d here.

ter, in these lessons, unless specifically stated
, all references to tuberculosis are to be under-
pertaining to real or manifest tuberculous *dis-*
nical tuberculosis); not to a mere trace of in-

How the Disease Begins

ulosis has a very variable and irregular course,
irst noticeable effects vary widely in different
here is, however, one feature that is associated
ly all cases—the slowness of its onset. The evi-

* term *symptoms* is meant any indication, of whatever
at something is wrong with the well-being. It goes
aying that the individual, himself, may be entirely
f the true significance of the symptoms.

dences of the disease appear very, very gradually—much more gradually even than is ordinarily supposed. There are of course a few cases in which the disease breaks upon one rapidly indeed (see "Galloping Consumption," later in this lesson); but in the great majority of instances it creeps in so slowly and its few manifestations are added so infrequently, that quite commonly the individual entirely fails to heed them. He may incline toward the belief that he has always suffered in the same way, or may consider that the little disturbances he has noted are merely the normal experiences of everyone as he grows older. Again, he may attribute them to some trivial or entirely unrelated matter. It is often necessary to look back over a long period—often several years—in order to see that he is no longer enjoying free-and-easy and unlimited health.

The Significance of Tuberculosis in the Family

The bare history of tuberculosis in one's ancestry, on which much stress was formerly laid, is now given less weight as an aid to the recognition of the disease. The fact that one's *distant* relatives have suffered from the disease is practically of no moment. When, however, the immediate relatives (for example, the parents, grandparents, or brothers or sisters) have been tuberculous, the matter assumes greater importance. Even so, such an occurrence bears really pointed significance only if the illness of the relative occurred at such a time that the suspect was intimately associated with the sick person over a long period. *If such association occurred during childhood the child is almost sure to have become infected, and the probability is large in this case that the infection gained deep foothold and will develop sooner or later into evident or manifest tuberculous disease.* The absence of tuberculosis in the family has no bear*ing of* importance.

Pointers in the Personal History

Dangers of Intimate Association, Even Years Previously. If one has been closely associated with a victim of the disease (who suffered from "open" tuberculosis, see Lesson IV) this often furnishes a very valuable clue to the nature of the present ailment. It should be remembered that exposure many years previously may be the cause of the present outbreak. (As a matter of fact, infection usually takes place during childhood—as described in Lesson II.)

Retarded Convalescence from Certain Diseases. The history of "kernels" in the neck, or sometimes in other parts—"scrofula" (which often means tuberculosis of the lymph glands)—in childhood, is important; as is also the history of unusually slow convalescence from other diseases. Retarded recovery from measles or whooping cough is especially suggestive; the more so, if followed by a protracted cough, or if one has not been strong since the attack. Many of the cases of so-called unresolved pneumonia or chronic "grip" are actually tuberculosis.

There Is Always a Reason. Many individuals who have always been delicate or to whom the term "weak constitution" applies, are really suffering from tuberculosis. If you are one of those who say: "I have never been strong," or "I cannot remember when I had a well day," or "I have not been really up to par for years," remember that there is a reason—and the reason may be tuberculosis. If, in addition, you are under weight and have the long, flat type of chest, the suspicion grows stronger. (This type of chest, formerly looked upon mainly as predisposing to tuberculosis, is now considered in many cases to be a result rather than a cause.)

Many a "puny" child owes his frailness to tuber-

culosis. Other children, who perhaps have adenoids or enlarged tonsils, who are almost constantly sick, who "catch nearly every disease that comes along," may owe this general susceptibility to disease to the fact that they are already victims of this plague; which in turn so lowers their resistance that they fall a ready prey to many ills. Carefully conducted scientific study made in late years has shown that just as many a backward child of the South owes his "laziness" to the "hook-worm," so many a delicate individual is, unknown to himself, laboring under a handicap—tuberculosis—a handicap which fortunately can usually be thrown off by the application of proper measures.

Excessive Mental Concentration and Overwork May Precede the Breakdown. In some instances the outbreak of the disease is preceded by intense physical or mental strain, or both, such as unusual business difficulties, the care of a sick member of the family, or the like—which so sap the resisting power of the individual that, if in addition he is thrown into close contact with a person ill of tuberculosis before he has gotten back into condition, the disease is liable to secure a firm grip upon him. Or, as the case may be, a previously dormant focus of the disease (of the existence of which one may previously have been entirely in the dark) may at this time flare up and lead to a quite evident outbreak.

Danger Signals

In an earlier paragraph it was stated that those who wished to fortify themselves by acquiring a knowledge of the symptoms of tuberculosis, should at the outset endeavor to free the mind of all preformed ideas on the subject. As they proceed, they will see that this is necessary because **many things formerly considered forerunners of tuberculosis (that is, paving the way for**

its development) are now known to be quite often evidences of tuberculosis itself.

GROUP "A"—SUGGESTIVE WARNINGS

1. A Run-down Condition. The sufferer from tuberculosis may first be made aware that something is wrong by the fact that he is noticeably "running down," —by the realization that his customary vim is lacking, or that his ambition or zest for work is failing. An unexplainable languor comes on at times, and is quite likely to be attributed to laziness. Ordinarily feeling well and seemingly strong, yet he often finds himself suddenly growing tired. He seems to have plenty of strength, but lacks "staying power"; slight efforts, previously pleasant, have become irksome; that which was formerly easy, now is a task—a drag. Yet, tho he plays out quickly, to his surprise a short rest may suffice to brace him so completely that he is led to think, "Oh, it is nothing." Still, he has a vague sense of uneasiness; an ill-defined feeling remains that all is not right. Quite commonly, associated with these changes, the victim notices that his appetite is failing, or that it is one day good, the next day poor; or he may be troubled with other more definite disturbances of the stomach. As time passes, there may come to him who is passing through these experiences, the thought, "I'm young and should be enjoying my best years; yet here I am—playing out! What can be the matter with me?"

Nerve Fag. In other cases, *nerve* fag may dominate the picture, or may be the earliest sign that the human clock is running down. Things that require considerable output of nervous energy, such as brain work, may tire one more than physical labor. The individual may find it hard to concentrate his attention upon the matter in hand, may lack decision, or may even lose

interest in things, developing an unwonted "don't care" attitude. He may notice that his disposition is changing, that he has become peevish, easily irritated and worried by small matters—that he has acquired a temper. Spells of despondency may occur. Restlessness may become prominent and sleepless nights frequent; or on the other hand, it may be noticed that after a night of comparatively sound sleep one does not feel refreshed as usual. These or other manifestations of "nervousness" may influence the sufferer or his physician to assign the run-down condition solely to a mere "nervous break-down."

Many do not know that very *early in tuberculosis one may be entirely free from cough*, and that some of the symptoms just described (due in part to the effect of the poisons seeping out from the focus of disease on the nervous system and body as a whole) may be the only apparent evidence that something is amiss. It goes without saying that symptoms of this nature are not always caused by tuberculosis, yet tuberculosis is one of the most common causes of a run-down condition and of "nervous breakdown." Unless, therefore, such symptoms are definitely traceable to overwork or other proven cause, and also if the manifestations are disproportionately severe, tuberculosis should be suspected.

2. **A Loss of Weight.** A loss of flesh in some cases occurs early. Even a slight decrease in weight, if progressive, or if associated with other symptoms, is important, unless otherwise accounted for.

3. **Fever, Chills or Chilly Sensations and Sweating; Rapid Heart.** If fever develops (and it should be understood that early in the disease fever is often absent, and in fact in some cases is not *detected* throughout the complete course of the disease), it is apt to be low at first—often not more than a few tenths of a degree, and detectable only by a thermometer; it is irregular in many

cases and may recur only in periodical waves, following an interval of several days or weeks during which the temperature is normal. When present, the rise may occur only at a particular time of the day, most likely in the afternoon or evening. Disagreeable chilly feelings or distinct chills may occur. Likewise, one who has not previously perspired easily may discover that now he sweats freely on the slightest provocation—at times merely as the result of a little excitement. Sweating under one or both arms, and sweating during sleep, are especially suggestive.

Noticeable Beating of the Heart. Fluttering of, or rapid beating of the heart, which may be so forcible as to be perceptible to the individual, is ofttimes an early symptom.

4. Shoulder and Chest Pains. Aching or painful sensations, usually of a dull character and moderate, in or near one or both shoulders, but which may extend to the arms or the neck, are fairly common accompaniments of disease in the chest. Too often, it is taken for granted that such pains are caused by rheumatism. Recurrent, wandering chest pain, one day in one part of the chest, the next day in another part; and pain which persists for some time in the same place—or "sore spots" on the chest—each and all are characteristic of tuberculosis.

GROUP "B"—MORE DEFINITE EVIDENCE

1. Cough and Clearing of the Throat. When cough occurs *early* in tuberculosis it is usually dry—a mere hack—and is often erroneously attributed solely to the tickling sensation in the throat that precedes it. The cough may occur only after talking, after laughter, singing or other exertion that tends to deepen the breathing; again it may be produced only by excitement. In

other cases it may be noticed only in the morning, in which event it is likely to be ascribed entirely to the fact that one has just stepped out upon the cold floor; or at night—in this case the blame is commonly laid purely to atmospheric changes. *A tendency to clear the throat at short intervals is also of importance.* Too frequently, without investigation, smoking or nervousness is assumed to be the root of these symptoms.

Later, as the disease progresses, sputum will probably form, but is likely to be scant for some time, and in many cases is so easily raised—without cough—that one is convinced that it comes from the throat. In this case, the wave-like motion of the cilia (minute hair-like processes or lashes) that line the bronchial mucous membrane carries the sputum up into the throat, where it is first brought to the attention of the individual, and is then readily hawked out. It is unfortunately true that some persons, who have a "loose" cough yet produce nothing, involuntarily swallow their sputum as soon as it reaches the throat. Make sure, therefore, you are not being misled into believing that you have no sputum, when perhaps in fact you are not only running the chance of doing yourself harm by swallowing it, but are unconsciously delaying the day when your ailment will be recognized so that you may start to rid yourself of it forever.

2. **Hoarseness, Loss of, or Weakening of the Voice.** One or more of these, or other throat difficulties, in some cases usher in the disease. Fatigue of the voice, which may be evident only on reading aloud; or a slight huskiness, may give the first inkling that all is not well. When these symptoms occur early they are especially likely to be temporary and fleeting, but are often recurrent.

3. **Frequent or Prolonged Colds and Catarrh.** The

person who says, "Oh, I hardly get over one cold before I have another," may find right in this statement a valuable clue. Colds that are drawn out week after week, especially if frequently repeated, sometimes constitute the most conspicuous feature of either a straight out-and-out, or an underlying tuberculosis. This likelihood is strengthened if one has formerly enjoyed a relative freedom from colds. If the colds are deep-seated—chest colds—weight is again added to the suspicion; but colds beginning in the head are also important. Those who are accustomed to winter colds, but who now find that the colds show a tendency to drag on into the spring, should be particularly watchful. Summer colds having the characteristics just mentioned are also to be looked upon with perhaps special suspicion. Even a single cold that hangs on longer than a month should receive careful investigation.

The above statements are not to be understood as implying that all, or even the majority of colds are due to tuberculosis; for as a matter of fact most colds are entirely distinct and separate affairs, having absolutely no relation to this disease. On the other hand, it is equally true that colds of the type described are quite often in one or more ways, each standing partly as cause and partly as effect, closely bound up with tuberculosis.

Colds May Not Be What They Seem. In the first place, many of the so-called colds, and many supposed attacks of la grippe, are not what they seem, but are actually waves in the course of tuberculosis—characteristic flare-ups that are but the ordinary accompaniments of this disease. In other cases, colds lower the resisting power of the body and render the soil fertile for the growth of the seeds of tuberculosis. Altho the person so afflicted is probably unaware of the fact, it is often the case that there has been present in the lungs

for some time a latent or slumbering area of tuberculosis. Each cold gives only too good an opportunity for the dormant disease to light up and make a little further headway. In still other cases the exactly opposite influence prevails; in this case a preexistent tuberculosis furnishes the background—the suitable soil—upon which the colds develop. **Thus it is seen not only that tuberculosis favors the development of colds and that the colds in turn favor the extension of the tuberculosis, but it is noted that tuberculosis itself often has periodical outbreaks closely resembling true colds.**

All in all, it is apparent that the periodical group of symptoms which some of us are accustomed to cast out of mind, with the words "It is only a cold," often has a deeper and more serious meaning. Whatever the relationship that obtains in the given case, it is evident that beneath the mask tuberculosis is often hidden.

In like manner, *many persons suffering from supposed simple catarrh are really victims of tuberculosis.* Let it be emphasized also that true bronchial catarrh (chronic bronchitis) seldom occurs before middle life.

GROUP "C"—TELL-TALE SIGNS

1. Pleurisy. Pleurisy may manifest itself as a stitch or knife-like stab-in-the-side, made worse by deep breathing or coughing. At other times the evidences of pleurisy are less definite; in fact, some of the chest pains described above are due to a somewhat disguised pleurisy.

2. Bleeding from the Lungs. Blood-spitting or the raising of blood-tinged sputum, by giving timely warning, often proves life-saving. If blood has been expectorated, the source of which is in doubt, it should be remembered that bleeding from the lungs is not always accompanied by cough. In many cases, especially if

the loss is small, the blood wells up into the mouth or throat, and is then removed by a slight clearing of the throat, or merely by the act of spitting, cough being entirely absent. It is to be regretted that this peculiar sequence of events has thrown many a patient and his physician completely off the track.

In other cases it is erroneously assumed that the blood comes from the nose or the teeth. Again, altho less commonly, one is led by the observation that the blood spitting takes place at the time that menstruation is expected—menstruation itself perhaps not appearing—to believe that the bleeding from the lungs is simply Nature's way of compensating for the absence of the usual monthly period. The fact is, true, simple vicarious menstruation is rare, and bleeding from the lungs seldom occurs at the time of the expected flow, save when these organs are already affected by tuberculosis, or unless some other serious condition exists.

Weighing the Evidence

He who discovers that he is suffering from any of the symptoms mentioned should be on the alert. Rarely will all of the symptoms be noticed, perhaps not more than one or two.

The occurrence of one or more of those described under group "A" calls for a prompt search for the cause, which, especially if not readily found, is likely to turn out to be tuberculosis. Altho symptoms of this group are among the more common of the earlier evidences of tuberculosis, yet, owing to the fact that many other conditions are accompanied by similar manifestations, it is quite obvious that they do not furnish distinctive or conclusive proof of the precise nature of the illness. It is therefore apparent that every means for shedding additional light should be employed. Even then, recogni-

tion of one's ailment at a period when the signs are few is sometimes very difficult; the most painstaking inquiries and examinations by an expert physician in some cases failing to decide the matter. On the other hand, corroborative evidence is often to be had if a search is made for it, and it is surprising how often definite signs will crop out if one will only recall the history of his illness afresh. For example, if one's age is within the limits between which tuberculosis most frequently develops—the fifteenth to the thirty-fifth year—(altho it should be remembered that the disease occurs at all ages); or if to the symptoms are linked suspicious circumstances in the personal or family history, the probability that one is suffering from tuberculosis is given additional support.

Fortunately, if the disease be not recognized until symptoms of group "B" appear, the problem is still fairly easy of solution. The detection of one or more of the manifestations of group "B" alone should lead one to form a very definite suspicion. If some of the symptoms of group "A" and "B" are combined, the probability is very strong. The occurrence of either symptom of group "C"—that is, *pleurisy* or *hemorrhage* from the lungs (unless caused by pneumonia) means tuberculosis in nearly all cases, even tho no other evidences be present. The probability is so near a certainty that, unless tuberculosis can be positively excluded, the only safe rule is to consider that tuberculosis is responsible.

Tuberculosis a Disease of Ups and Downs

When one has recognized some sign pointing toward tuberculosis, there is a certain feature not appreciated by most persons but which should be thoroughly understood if the evidence is to be accurately weighed. In some cases it is true that after symptoms have once

appeared the malady continues to make steady progress; but this is exceptional; characteristically the disease **has a seesaw course—a course of ups and downs.**

1. **The first symptoms will in nearly all cases subside sooner or later entirely of their own accord.** Without effort of any kind, the outward evidences of the disease disappear, leaving the individual *apparently* no worse for the attack. In some instances he may be left a little thinner and have a little less vigor; but in other cases he is fully as strong, has just as much vim, and takes as keen an interest in things as ever.

2. **Only in a minority of cases will this spontaneous abatement of symptoms be permanent.** A smaller group of persons, more fortunate than the rest, will go through life with health unimpaired by further outbreaks of the disease. In most cases, however, unless definite combative measures be put into effect, after a shorter or longer period of weeks or months or years, during which one's fears are lulled, the disease will break out again **ofttimes with greater intensity than before.**

Between the outbursts, a few months, or a year or more may elapse, while meantime one enjoys nearly perfect health. Like the first attack, the second may also subside without treatment. Later a third, or a fourth outbreak may occur. Sometimes, like the others, symptoms of these attacks, too, disappear, with absolutely no change in the mode of life. Quite often each succeeding attack becomes a little more severe and prolonged than the preceding one, each time leaving a little deeper mark upon the individual. In this manner—waves of activity alternating with periods of quiescence during which one feels comparatively well—the malady continues its slow, progressive march, until even in the intervals one does not feel quite up to par.

In this connection there is one fact that should be

indelibly stamped upon the memory: **Once outward evidence of tuberculosis has appeared, unless the proper steps be taken to counteract its effect, in nearly all cases the disease will sooner or later make further inroads upon the health, and in a majority of cases will ultimately cause death.**

False Conclusions and Pitfalls

It is to be regretted that this peculiar, irregular course of tuberculosis has led many into costly error. How common it is to hear some sufferer from the disease exclaim: "I've had this same thing before, yet I soon recovered. So I am positive it is nothing serious,"—therewith casting the matter completely from his mind.

True, the immediate attack may pass away without attention, but the vital question is: **Can one afford to neglect a condition whose final outcome is frequently so extremely serious?**

Then too, as time goes along and one wave in the disease follows another, each may be ascribed to a separate cause. In a former era, physicians themselves were frequently misled as to the precise nature of their patient's illness; for altho they were able to determine the basis of the immediate complaint that caused the afflicted person to seek counsel, not rarely they failed to recognize the real root of the trouble. For example, after finding that his patient was suffering from pleurisy, the physician may have overlooked the tuberculosis, which was perhaps the underlying cause; moreover, owing to the fact that pleurisy sometimes closely simulates intercostal neuralgia, the physician occasionally made the mistake of informing his patient that he was suffering from the latter ailment, and from it alone.

In other instances, due to the fact that tuberculosis is, as will soon be explained, sometimes ushered in by pneu-

monia, or because in still other cases tuberculosis perfectly imitates this disease, the physician diagnosed the condition as pneumonia, alone. So, too, the fact that throat symptoms frequently accompany tuberculosis has in the past again and again led to an erroneous diagnosis of "throat trouble" or "throat hemorrhage"—without detection of the underlying tuberculosis. On the other hand, the distress in the throat has sometimes been laid at the door of tobacco; and the victim has been told perhaps that he had a "cigaret cough." Occasionally, owing to the presence of misleading symptoms on the part of the stomach, a diagnosis of "stomach trouble" or "stomach cough" has been made. In yet other cases, the fact that the blood has been deficient in some element has been the cause of many a diagnosis of "anemia"; without discovery of the source of the anemia—tuberculosis. Similarly, the shortness of breath that sometimes accompanies tuberculosis has in the past at times led the physician to assume that he was dealing with pure "asthma."

Soothing Terms. Years later, owing in part to the retention by certain physicians of the old idea that the disease was incurable, and partly to the diametrically opposite belief that the tuberculosis would almost cure itself, there was a quite pronounced tendency for physicians to endeavor to console their patients by glossing over the real trouble with some less serious-sounding name. During this period, in their efforts to soothe the fears of the sufferer, well-meaning physicians were accustomed to employ some evasive term as a sugar-coating for plain everyday tuberculosis.

Thus, it not rarely happened that as each new outbreak of the disease occurred and as the sufferer drifted about from one physician to another, each in turn gave a new name to the ailment. At one time he was said

to have a "cold" or to have acquired la grippe, while perhaps the next attack was attributed solely to a "nervous breakdown." Again, the individual was told that his "lungs" were "weak," or that he was "threatened with tuberculosis," and that if he did not watch out he would get it; or he was led to believe that his lungs were "a little bit congested," but was further informed that this was not serious. The next flare-up was perhaps laid to a "bronchitis" or to "bronchial catarrh"; perhaps the blame for the following outbreak was shouldered on to "malaria" or typhoid—and so on.

Concealment No Longer Tolerated. More recently, with the advance of science and of the knowledge of tuberculosis, as the realization that the middle ground is the right one has gained circulation—that is to say, since it has been appreciated that altho tuberculosis is curable, yet in order to retrieve his health the sick person must make genuine and definite effort—it has been generally agreed upon that if the patient is to direct his efforts intelligently he must be informed of the nature of his illness, and the old plan of concealing the facts from the invalid is fast falling into disrepute.

Illustrative Cases

Case 1. A boy, age 14, who wished to join the gymnastic class of the Y. M. C. A., was examined to determine his physical fitness. This youth felt strong, had no symptoms of any kind, and to casual inspection seemed to be in perfect health. Physical examination showed a robust, well-developed body, no abnormality being found. On the other hand, a tuberculin test applied to the skin gave a positive response; however, the fact that the reaction did not appear until three days after the test was applied, weighed in connection with the absence of symptoms and the negative results of the physical examina-

tion, led to the conclusion that while the boy harbored somewhere in his body a minute, hidden colony of the germs of tuberculosis, the infection was not enough to amount to actual disease in the ordinary sense of the word. Treatment not being deemed essential, the parents of the young man were merely informed of the facts and counseled to guard him from strain.

Case 2. A gentleman, age 27, desired an examination for the purpose of taking out life insurance. This man not only appeared to be in vigorous health, but absolutely free of symptoms, was actually enjoying life to the full. His weight was normal, and a careful examination of his whole body disclosed no deviation from the ordinary. Notwithstanding these observations, the routine application of a skin tuberculin test was followed by a *late* positive reaction. The gentleman was informed that at some time during life he had acquired a trace of tuberculous infection, which he probably still harbored, but was not suffering from tuberculosis, in the generally accepted meaning. This gentleman was a first-class risk.

Case 3. A youngster, a boy whose parents, both healthy, had been killed in an accident during his infancy, had at the age of two been adopted by another couple. His foster mother was then afflicted with, and continued to suffer for many years, from advanced tuberculosis. As a little fellow the boy was active, tho "not very stout"; he was sick from one cause or another a good part of the time. His stomach and bowels were quite often "out of fix," and at the age of three he was "taken down" with the measles—then came the mumps—then a severe cold which "almost went into pneumonia"—just one illness following on top of the other. His appetite was fluctuating, usually poor. When he started in school, the fact that his tonsils were large caused his teacher to advise that he be examined.

Inquiry disclosed the fact that in addition to his other symptoms he had a fever in the afternoon, and a complete investigation brought to light a focus of active tuberculosis, which tho fortunately incipient, called for immediate treatment.

Case 4. A school teacher, a young lady, age 22, had noticed that during the last year it had become necessary to force herself a little; that she seemed to be losing interest in her work, and was growing decidedly "nervous." She now felt quite tired after the day's duties were fulfilled, in spite of the fact that the work was no heavier than before. During the last few months she had been distressed or annoyed at times by a rather peculiar ache in her right shoulder and arm. She stated that she had no cough or expectoration, and could recall nothing else out of the ordinary. Inquiry into her personal and family history elicited the fact that at the time she was born her mother had "lung trouble" and that two years later the mother died of a "long-drawn-out pneumonia." The mother had personally cared for the daughter until a short time before death.

Altho the patient did not think she had lost flesh, the scales proved that her weight was five pounds less than it had been a few months previous. A two-hour record of the temperature kept for two weeks showed that she had a fever of 99.5° F. in the evening. A physical examination of the chest, as well as the X-ray, revealed signs of disease. A tuberculin test applied to the skin in the usual manner gave, within twenty-four hours, a strong response.

A diagnosis of early "closed" tuberculosis of the lungs was made, and the young lady was told that unless suitable combative measures were taken, the disease would probably continue to make headway.

Only half convinced, she did not see fit to give up her

work, hence could carry out the treatment only in ineffective form.

Eight months later the patient experienced what seemed to be a prolonged attack of the "grippe." Finally most of the effects of this attack disappeared, but although the cough abated, it did not cease entirely. Sometimes the cough was dry and unproductive, but at other times was followed by expectoration. Furthermore, she found herself still quite weak, several months after the height of the illness. Samples of the sputum were examined and found to contain the germs of tuberculosis (a result of softening or ripening of the tubercles); and other evidence of advance in the disease was disclosed. After these disclosures, the patient saw the necessity for making real efforts—and eventually she regained her health.

Case 5. A newspaper writer who had always had excellent health, at the age of thirty-two began to find that the strain of irregular living and long hours was telling. The morning's work left him tired and fagged; yet a short rest, or a little recreation at the club was usually sufficient to give him a new hold on things. After a time, however, he found that he did not become refreshed so quickly. Moreover, sleep was becoming difficult and restless nights rather a common occurrence. One day his throat began to annoy him, and a dry, rasping cough was added to his difficulties. Ascribing the cough to the use of tobacco, he decided to stop smoking, but found that this did not bring the expected relief. As time wore on, he tired more and more easily, and a long rest was now required to make him feel at all like his old self. However, his appetite continued good, and his weight normal.

Rather suddenly one night he was seized with a sharp pain in his left side, which became agonizing with every

breath (pleurisy). Meantime his cough increased, and now in the morning he usually raised a half teaspoonful or so of yellowish-gray sputum. At this period he sought medical counsel.

A glance showed a strongly built man with well-devoloped muscles and a large chest—face full, color good: apparently an athlete. On the other hand, a painstaking examination brought out positive evidence of lung tuberculosis, including the finding of the germs in the sputum.

Case 6. A young man of twenty-five who contemplated marriage, said that while he had never been really robust, nevertheless until recent years his health had stood up as well as the average, despite a life full of many strenuous activities. Nearly two years previously he had caught a severe "cold," which persisted for seven weeks. Since then, he had had five similar attacks. During the last of these "colds" he had been troubled with a soreness on one side of his chest; since then, he felt in the same spot a drawing or pulling sensation which was often associated with aching. On being asked the question: "How long since you have felt perfectly well?" the answer brought surprise to his face. He was unable to say that he had felt like himself during the last five years.

A careful study of the case, plus repeated examinations, including the use of the X-ray, finally brought out the cause of ill health—tuberculosis.

The young man was told of the dangers of marriage under such circumstances, and was given detailed instructions as to the means of cure. Failing to appreciate the true significance of his failing health, or perhaps considering that the matter would "blow over," altho he decided not to marry, he carried out barely at all the plan of treatment. Notwithstanding this apathy, things





CAN YOU TELL WHICH MAN HAS TUBERCULOSIS?

Both men appear to be enjoying health. The man on the right is actually well, but the man on the left has active tuberculosis and is in danger of losing his life unless prompt measures are taken. Appearances must often be discounted if tuberculosis is to be recognized at an early period.



went fairly well until a year or two later, when he was seized with a violent attack of genuine la grippe, after which the inroads of the tuberculosis became indeed rapid. At last, the occurrence of several severe hemorrhages brought the patient to a realization of the seriousness of his condition; from then on he was an ideal patient.

Case 7. A slender, rather pale young man, age eighteen, complained of feeling feverish at times during two preceding months. He said that he had noticed that he perspired more than usual, and that often when he became a little excited the sweat would trickle down his right arm. Several times while asleep—once when he was sleeping in the daytime, the other times at night—he broke out in a profuse perspiration.

Responding to questions, he said that his brother, who had been his bed-mate since infancy, died of consumption when he (the patient) was four years old. He stated further that he had never been strong, and that so far as he could remember he had always suffered from "catarrh," which made it necessary for him to clear his throat or to cough frequently. This "catarrh" had been worse during the period that he had the feverish sensations. He felt weak at times and had lost a few pounds weight.

A specimen of sputum, which the patient said differed not at all, either in appearance or in the manner in which it was brought up, from the supposed catarrhal sputum that he had raised for years, contained many tubercle bacilli. Upon this finding, supported by other evidence, the diagnosis of a slowly progressing low-grade tuberculosis, which had existed for years, but which had recently flamed up anew, was made.

Misleading Symptoms

If one understands that the poisons from the seat of disease are carried in the blood stream to all parts of the anatomy; that the vagus nerve (which supplies the lungs with nerve fibers) also sends branches to many other organs, including the stomach and bowels, the liver, the heart, the throat and the voice-box, and the ear; that this same nerve is but a link in the immense and intricate network of nerves with antennæ reaching to the body's most distant recesses; that the destruction of lung tissue in the course of the disease, and later, the contraction of the scar that replaces the destroyed tissue, produce mechanical disturbances in the lungs, as well as in the nearby organs; that in one or other of these ways or in other manner, the function of the heart is likely to be disturbed (this in turn interfering with the proper circulation of blood throughout the body)—if these facts be recalled, one is not surprised to learn that the outward **evidences of disease of the lungs ofttimes appear in other organs, or in parts of the body far from the focus of disease.**

In some cases manifestations of this character (variously named, *reflex, referred* or *sympathetic* symptoms) are so prominent as to overshadow—at least, for the time being—the more positive and definite signs. However, even in such cases, if one will reflect on the matter, there will usually come to light some of the more distinctive earmarks of tuberculosis which will put one upon the right track.

Examples of Deceptive Cases

Case 8. A cigar-maker, age 33, a moderate smoker, who had never before been seriously sick, of excellent physique, had first experienced some nine months previously a difficulty in carrying on a sustained conversa-

tion. Altho his voice was clear, speech required more than ordinary effort and his throat frequently felt tired. After a while, moreover, his voice became husky; in a short time it was lost almost completely. Still later, after he had passed a month virtually without speaking, his voice again grew stronger and for quite a period was practically normal; yet ever since this attack he had been now and then distressed with an indefinite aching or an uncomfortable full feeling in the throat, which caused him to hawk and spit. During the last two weeks the hoarseness had begun to trouble him anew.

This was all that he complained of, but questioning brought out that during the last six months his strength had been below par and that he had been noticeably nervous and irritable—ofttimes unaccountably "blue" and at other times rather careless of what happened. Now and then an odd fluttering in the neighborhood of his heart had led him to wonder if this organ was not at fault. His appetite was not good, and he was seven pounds under his average weight. On some days, especially when he was very nervous or tired, he had been distressed by a disagreeable feeling of pressure or a dull pain over the upper part of his right side and in his right shoulder.

The thermometer showed that his temperature jumped up more than it should as the result of excitement or slight exertion and other small causes. Repeated examinations of his throat with a mirror showed no evidence of tuberculosis in this situation. Examination of the chest, on the other hand, disclosed abnormal signs in the right lung; and tubercle bacilli were found in the sputum.

Case 9. A lady, age twenty-four, who had previously been well, said that she had been cared for a good deal during childhood by a cousin who at that time was

troubled with a "loose" chronic cough, and who was later informed that she had tuberculosis. In the year just passed, the patient had nursed her husband through a protracted siege of illness (not tuberculosis) a period during which both her physical and mental strength was sorely tried. She stated further that she had not menstruated for three months; that recently she had been distressed by gas on the bowels, that she had had several spells of vomiting, and two attacks of diarrhea associated with cramps. Her appetite had almost entirely disappeared. She asserted that she felt very much "run down" and that she had lost flesh, altho she did not remember her former weight. On close questioning, she finally recalled that she had been troubled at times by a "nervous cough" and that she occasionally raised a little sputum.

A thorough examination of the pelvic organs was made, but no abnormality of the generative system was discovered. Specimens of her blood showed an anemic condition (deficiency in iron and corpuscles). Attention given to the stomach and bowels brought out no structural change from the normal. Examination of the lungs, however, revealed pronounced signs; and the diagnosis of tuberculosis was confirmed by the detection of the germs in the expectorated matter. The patient was told that the absence of the monthly periods need cause no concern, as this was apparently a conservative effort of Nature that required no treatment.

"Galloping" or "Hasty" Consumption

Altho, as previously stated, in the great majority of instances tuberculosis creeps upon one very gradually, there are a few cases in which the symptoms develop so rapidly that the individual is desperately ill almost from the outset. This acute type of the disease, known as

"hasty" or "galloping" consumption, is often ushered in by an outbreak of symptoms that bear a striking resemblance to ordinary pneumonia; the similarity often being so marked that the true nature of the illness is discovered only when the sick person fails to convalesce promptly. The mortality is high in such cases; but even so, one has the consolation of knowing that if death is to be his lot, it will probably come soon. Furthermore, it is fortunate that in some of the more favorable cases of "galloping" tuberculosis, when improvement once sets in, it, like the onset of the malady, may progress with corresponding rapidity. In other instances the first step toward recovery is a change in the type of disease to the milder, familiar chronic form.

Fibroid Tuberculosis

A Very Mild and Slow Type. By way of contrast with the severe and rapid form of tuberculosis just described as "galloping" consumption, it may be noted that there is another variety of the disease that is exceedingly chronic and extremely mild—*fibroid* tuberculosis. This type, named "fibroid" because of the large amount of fibrous tissue (healing tissue or scar) that is built up in the lung, runs an extremely slow course—a course that is frequently drawn out for ten or twenty years, and occasionally thirty years or longer. During this whole period, fever may not be detected and the few symptoms of the disease are added so slowly that it is necessary to be alive to their significance if the cause is to be discovered in time. It is well for it to be understood, however, that there is no radical distinction between this and the other varieties of tuberculosis, the distinction being merely one of degree.

The milder character of this low grade type of the disease is due partly to the fact that there is but little

"breaking down" or softening of tissue. Again, the inroads of the malady appear so slowly that even to Nature they are all but imperceptible. Hardly awake to the menace, Nature puts up only a sluggish fight; the consequence being that altho an effort is made at healing, the formation of scar tissue often fails to quite catch up with the advance of the disease. In this manner the disease wanders through the lungs, the scar development just about keeping pace with, but lagging always a little behind, the advance of the disease process; the upshot being that the extensive overgrowth of scar replaces the destroyed lung cells and, as it contracts, produces serious mechanical disturbances in the heart and other surrounding organs. Thus incidentally, as the growth of scar becomes widespread throughout the lungs, shortness of breath and blueness of the lips, etc., are apt to become quite noticeable.

The presumption is natural in such cases that a slight change in living conditions would be sufficient to restore the balance in Nature's favor. As a matter of fact, experience has confirmed this conclusion; for as a rule fibroid tuberculosis responds very readily to treatment.

Fibroid Tuberculosis Not to Be Neglected. However, one who is afflicted with this variety of tuberculosis should not assume that because the manifestations are slight, measures for recovery are unnecessary. He should understand not only that fibroid tuberculosis tends in the long run to make one a sort of cripple and to shorten one's days, and is eventually liable to prove fatal, but should realize also that at any time it may change into one of the more rapid and more dangerous types. For these reasons he should at once put his heart into a real and earnest fight, with no let-up until the disease has been completely conquered.

What to Expect from One's Physician

In order that one may be prepared to help one's medical adviser in every way possible, it seems well to give some idea of the customary procedure followed by the up-to-date physician in dealing with cases that may possibly be tuberculosis.

Elements of a Thorough Investigation. In addition to answering the questions put to him by the physician, a thorough examination of the chest will be required. For this purpose it will be necessary to strip the body to the skin, as an examination made through even a thin garment is almost worthless. The physician may also desire to make, or have made, an examination of the chest by the X-ray; he may in addition wish to make a general examination of the whole body and may request samples of the blood, urine, etc., for analysis, or may deem it wise to make other tests. If one raises sputum, the physician will probably wish to examine at least one specimen. In this connection, before asserting definitely that he has no sputum, it is important for the patient to make certain that in fact he is not unwittingly swallowing the sputum immediately after it is raised. Unless the physician requests otherwise, when saving the sputum, one should collect and submit every particle that is spit out. Under no circumstances should one take for granted that the expectorated matter comes from the throat, and therefore withhold part of it from the specimen.

The Expert May Detect Tuberculosis Before Germs Appear in the Sputum. Here let it be made clear that the diagnosis of tuberculosis can often be made before the germs appear in the sputum, and that, furthermore, in a few cases (for example, fibroid and "closed" tuberculosis) the disease runs its course from beginning

to end, yet bacilli are at no time expectorated. In short, in doubtful cases, the finding of the germs of the disease in the sputum will clear up the diagnosis; in other cases, however, the tuberculous nature of the condition may be fully established by other means; bacilli in the sputum are then unnecessary to the diagnosis. In such instances it is folly to waste valuable time waiting for their appearance. (See Case 4.)

In certain cases it is necessary for the sick person to keep a record of his temperature, and perhaps of his pulse, for a considerable period—say, every two hours for a week or more.

In Doubtful Cases Repeated Examinations and Prolonged Observations May Be Necessary. Ofttimes the physician will be unable to arrive at a definite conclusion on the first visit; it may even be necessary for him to follow the case along for some days or weeks, re-questioning his patient from time to time, making a new examination occasionally; thus making his study of the case a sort of serial affair. If in the intervals one will think over things in the light of the physician's questions, facts which will be of considerable aid but which were forgotten during the former consultation will often be recalled.

In many cases a tuberculin test may appear advisable; again inoculation of an animal with sputum suspected to contain tubercle germs (the germs perhaps being so few in number that searching for them in the ordinary manner is like hunting for the proverbial needle in the haystack) for the purpose of ascertaining whether or not tuberculosis is established in the animal—or the X-ray, will be of assistance in throwing light on the subject.

The Tuberculin Test and Its Use

"What Is the Tuberculin Test? Is It Safe? Should I Permit Its Use?" In answering these common queries, it may be stated that tuberculin is a substance prepared from dead tubercle germs, which, when inoculated into the body of a tuberculous individual, produces (with certain well-defined exceptions) a characteristic response known as the tuberculin reaction. According to the manner in which the test is made, this reaction may be detectable (1) locally, at the point of application; (2) at the seat of disease; or (3) as a general phenomenon, accompanied by fever or the like; or it may manifest itself in more than one of these ways.

The danger from the general test, when carefully and intelligently administered, is so nearly nil that it may ordinarily be disregarded. However, inasmuch as just as valuable information can usually be gotten by using one of the local skin tests, and as the fever reaction is somewhat disagreeable, the general test is not ordinarily called for. The skin tests are entirely harmless, have no objectionable features, and *when properly interpreted* (as indicated in illustrative cases Nos. 1, 2 and 4) may give considerable help to the physician.

Tuberculin is sometimes applied to the eye. In the great majority of cases this proceeding is harmless, but in rare instances injury has resulted. For this reason, and because equally reliable information can usually be obtained by the other tuberculin tests, the eye test should not be employed except in extraordinary cases.

What Is the Value of X-ray in Diagnosis?*

It is quite common for either too high or too low an estimate to be made of the power of the X-ray to detect

* A discussion of the value of the X-ray as an aid to *recovery* may be found in Lesson XV.

and differentiate structural alterations in the lungs. The fact is, altho *in the hands of an expert* at times exceedingly helpful in throwing light on the nature of one's illness, the X-ray is by no means infallible. Like other agencies useful in their place, it, too, has inherent deficiencies. As an example of its limitations, it may be stated that in the shadows cast by the X-ray the evidences of early or slight tuberculosis are sometimes entirely lacking; again, the scars of healed tuberculosis are with difficulty distinguished from areas of active or progressive disease—so the value of this agency as a diagnostic aid is for these reasons considerably lessened. In most cases a careful consideration of all other factors will lend accuracy to the diagnosis. Occasionally, however, as, for illustration, if the area of the disease be centrally located (that is, so far from the surface as to be indetectable by ordinary methods), and if the results of the X-ray examination be weighed in connection with other evidences, the X-ray may prove of pronounced value. So also, the X-ray is invaluable in recognizing certain complications of tuberculosis. Then, too, during war time, in the routine examinations of large bodies of soldiers, the X-ray is of more than ordinary utility. This is so in part because the history of the case for one reason or another may be over or under colored by the applicant, and because—under such circumstances—at best only a limited time can be given to investigation of the case by the usual methods.

On Making Your Own Diagnosis

Those of you who have reason to suspect that you are suffering from tuberculosis, are very strongly advised to place your case in the hands of a physician for final decision. Yet certain circumstances may force upon you the necessity of diagnosing your own case. If this be-

comes necessary, with reasonable care in estimating the pros and cons, you will very likely be able to decide the matter with sufficient accuracy to justify you, if the verdict is in favor of tuberculosis, in at once instituting measures to eradicate the disease.

If this course must be followed, there are several matters now to be discussed, to which special attention should be paid.

One's Feelings Not a Trustworthy Guide to Fever. The fact requires emphasis that the feelings are not to be relied upon in deciding whether or not the sick person has fever. On the one hand, it is quite frequently the case that the patient who has no fever, will seem so hot and flushed that he is convinced that his temperature is above normal. (In this connection, however, it should be remembered that these hot flushes simulating fever are also common accompaniments of tuberculosis, tho of course by no means peculiar to it.) On the other hand, many and many a person having considerable fever has been sure in his own mind that he had none. (In such instances fever sometimes has an effect similar to a drink of whisky, serving to cover up the ill feelings of the sufferer, so that he actually feels better and even exhilarated at this time.) In neither case can the feelings be accepted as an accurate guide.

The Use of the Thermometer. For these reasons it is very necessary that a thermometer be used if it is to be ascertained definitely whether or not one has fever. That the test may be free from error, the temperature must be taken at regular intervals over quite a period. This means that in doubtful cases the temperature should be taken every two hours, except during the night, for not less than one week.

In taking the temperature the bulb of the thermometer should be placed well beneath the tongue, and the mouth

kept closed for three minutes or more—longer during very cold weather. It will be well to establish this three-minute rule even tho it is claimed that the thermometer will register in a minute or less. It is not advisable to take the temperature for at least fifteen minutes after taking either a hot or cold drink. Previous to placing the thermometer in the mouth, one should see that the mercury is well down toward the bulb. On hot summer days the act of "shaking down" the mercury should be performed just *before* the temperature is taken; for atmospheric heat sends up the quicksilver the same as does the heat of the body.

The Normal Temperature of the Human Body. In interpreting the readings of the thermometer, it is important that one be acquainted with the temperature of the body when in health. This, tho varying slightly in different individuals, has fairly definitely fixed limits. It should, however, be understood that normally the temperature does not remain constantly at one point; but has, or may have, a daily range of about one degree and a half, Fahrenheit. The mouth temperature of the average healthy adult, during rest, varies with remarkable consistency between about 97° F. on awakening or during the early morning, and 98.6° F. at its acme, the highest point being reached at any time between noon and ten P. M., or exceptionally at other hours.

Under ordinary conditions the temperature seldom extends beyond these bounds, except as now to be noted:—

Some Exceptions. For a few persons, especially those of nervous temperament, the maximum temperature is slightly higher. However, the mistake should not be made of assuming without investigation that nervousness, alone, is the cause. It should be recalled that nervousness is often merely the outward expression of some

deeper trouble, which not infrequently will be found to be tuberculosis. Undue mental excitement, such as may be occasioned by fright, great joy, or the reading of an exciting story; severe muscular exertion; extreme changes in the temperature of the surrounding air; the eating of a very heavy meal; constipation and other disturbances of the stomach or bowels—all these influences produce perfectly natural changes in the bodily temperature. In health, the variations thus occasioned are as a rule scarcely noticeable, usually amounting to not more than a few tenths of a degree, and are ordinarily only occasional and temporary. *Those who are suffering from tuberculosis, on the other hand, will probably find that the fluctuations are more pronounced.*

A Rise in Temperature at or Near Menstruation Common. Women who are keeping a record with the thermometer are likely to observe that the temperature has a rather characteristic rise, as the case may be, preceding, during, just following, or between the monthly periods. This so-called menstrual wave, which may last from a few days to two weeks, is fairly common and, so long as it remains within reasonable confines, seems to be perfectly normal; a rise at this time, therefore, need cause no especial concern if not higher than a half, or at most a degree, and if not accompanied by other suspicious manifestations. The absence of the menstrual wave has no significance. Tuberculosis often causes the rise to be higher; so, too, other symptoms such as cough and expectoration are liable to be worse, or may appear only at this time.

Variations During the Extremes of Life. One should bear in mind also that during infancy and childhood the normal temperature is on the whole a little higher, and in old age somewhat lower, than during middle life.

The Error of Discounting Your Preliminary Conclusions. Lest the wish prove father to the thought it is well for you to be sure that you do not persuade yourself against your better judgment, or allow others to delude you into the belief that your symptoms are due to some minor ailment. If fairly convinced that your symptoms are due to tuberculosis, you should fortify yourself against making the mistake that many have made of discrediting this conclusion solely because your appearance is robust, because the symptoms have existed for quite a long period—it may be, even many years—with seemingly no serious effect, or because at some previous time you have suffered from similar attacks from which you readily recovered. As a matter of fact, the occurrence of previous outbreaks of similar character adds weight to the belief that tuberculosis is the cause. Furthermore, as experience has thus taught you that the subsidence of symptoms has not been permanent, the probability is large that, if left alone, the disease will continue to advance.

Should One Wait to Make Sure? If with approximate exactitude in your own mind, you have established the diagnosis of tuberculosis, it is as a rule a mistake to wait long in order to make sure. A delay of even a month or two will make recovery less certain and may even spell failure. Inasmuch as the measures useful against tuberculosis are simple, and as they offer a large chance of benefit whatever the cause of your ailment, if you have made reasonably sure it is strongly advised that definite steps toward recovery be taken at once.

LESSON VI

YOU AND YOUR PHYSICIAN

In the preceding lessons the invalid has been advised against relying entirely upon his own resources, either in diagnosing the disease, or in making the fight against it, unless this course is forced upon him. Under all other circumstances he is strongly urged to put himself entirely in the hands of some competent physician whose advice he will abide by. However, before entrusting the conduct of his case to any physician, it is important to make sure that the physician is well qualified to deal with tuberculosis; for there are quite a number of physicians who do not have these qualifications—a fact which has often made it difficult for the sufferer to obtain a prompt and correct diagnosis, or to secure proper treatment. It is to explain how it has come about that a considerable number of physicians have found difficulty in dealing with so ancient and common a malady that the following paragraphs are written.

The Cause of a Peculiar State of Affairs

In a general way, it may be said that in the past, two obstacles have blocked the path of progress in the knowledge of tuberculosis. Most physicians who have attained renown through their ability in coping with the disease, as a preliminary to success have had to overcome (1) the handicap of inadequate training, (2) the limitations on their opportunities for personally observing and studying the disease. In a moment it will be shown that the second item is, strange as it may seem, due principally

to the inherent peculiarities of the disease itself. A little later, suggestions that will aid one in recognizing the competent physician, will be given. For the present, however, it seems worth while to spend a little time in viewing the first item more closely.

1. Inadequate Training. The root of the difficulty is that the course of study in medical colleges is overcrowded. There is too much for the student to learn in four, or even in five years. Some subject must be slighted, and, strange indeed, one of the most prevalent of serious ailments, tuberculosis, has often been the subject most neglected.

To-day one of two extreme and opposite views prevail concerning tuberculosis: (a) The disease is still held by a few to be almost incurable. (b) By others, it is considered so easily curable that it is reckoned as virtually healing itself. As may be surmised, those on each side of the question have in the end reconciled their conflicting beliefs by reaching through different routes the identical conclusion that small good will come from efforts directed toward recognizing and treating the malady.

One or the other of these opinions has been quite common not only among the public in general but also, altho to a less extent, among physicians. Even more unfortunately, these ideas have to some extent been accepted by those who have had charge of arranging the course of study in medical colleges. The consequence has been that until comparatively recently instruction on this very important disease, in many schools, has been scant, and not rarely untrustworthy. In the last few years a broadening education on the subject has resulted in the introduction of a more thorough and dependable teaching along this line, so that the more recent graduates are much better equipped to deal with tuberculosis.

2. Limitations on the Physicians' Opportunities for Personally Observing and Studying the Disease. A second factor that adds to the difficulties of the situation is found in the inherent nature of the disease itself. Because the course of the average case of tuberculosis is very irregular and marked by many periods of ups and downs, and also because the illness is drawn out over a period of years, it is seldom possible for the physician in general practice to keep close tab on the individual patient throughout the complete course of the disease. For this reason it frequently comes about that the physician does not know what ultimately happens to his patient.

Moreover, up to a certain point, tuberculosis has a pronounced tendency to respond both favorably and fairly rapidly to slight alterations in the mode of living. It is not rare for a patient even in an advanced stage of tuberculosis to improve remarkably in a very short time. The change for the better is, in fact, often so decided that after spending only a few weeks or months under suitable conditions, the former frail and feeble invalid has become—in all outward aspects—entirely well; yet true healing in the lungs may lag far behind.

Now if it is recalled that the new threads woven by Nature to take the place of those damaged by ill health are at first only too easily unraveled by any little backsliding; and if it be further realized that just at this danger period (when he has begun to feel and to appear well) the patient is likely to suddenly terminate the relationship with his physician, leaving the latter with the impression that his patient has been cured—looking at the matter from this angle, we see how natural it is for the physician to feel and say, as he often has: "If good results can be obtained so promptly and surely when the disease is advanced, what will be gained by making an

effort to diagnose the condition earlier? Likewise, even tho I should run across a case of tuberculosis in its incipiency, will it be wise to wound the sufferer's feelings by telling him the truth about his ailment, when he will regain his health just as assuredly without this knowledge?"

Here is the answer: After the patient has passed from under the watchful eye of the doctor, all too frequently **it is not long until the improvement mistaken by the physician for true recovery proves to be only a mirage, luring the victim on to a further and further disregard for the rules—a counterfeit show of health which is liable to be soon lost if the former habits of life are resumed too early.**

In this manner it is made evident how hard it is for the physician to believe that the disease is really serious and to appreciate the necessity for prompt and prolonged treatment (even tho he has been taught that this is true), unless he has observed many cases from beginning to end—which means, as a rule, over a period of years. Inasmuch as the physician seldom chooses this line of endeavor at the outset, it is not often that he is given the chance to study the disease at first hand unless some whim of Fate—some unusual turn of events, such as tuberculosis in his own family—has led him to devote an extraordinary amount of time and attention to the subject.

Incidentally, it may be noted that probably every physician who has at one time been engaged in general practice but who has later been drawn or forced—so to speak—into specializing in tuberculosis, can then look back on his earlier years of practice and recall more than one instance of slight or even extensive tuberculosis that he had passed over honestly—perhaps without the remotest suspicion of the real trouble.

How Evasive Terms Have Caused Disaster

A few decades ago when tuberculosis was quite generally held to be incurable, it was a fairly common practice of physicians to endeavor to keep the true nature of the patient's illness from him by calling the disease by some other name in place of straight out-and-out tuberculosis. Altho in late years this plan has largely fallen from grace, there are still a few physicians who, actuated by the highest motives, continue the habit of glossing over the facts by using some term designed to avoid wounding the feelings of the sufferer, and to prevent what the physician conceives to be unnecessary worry and alarm.

Such a physician conscientiously believes that his patient's interests are best served by the withholding of the truth; the more so if the patient has come to him for some other ailment, or without suspecting tuberculosis. Hence, even to-day it sometimes comes to pass that instead of explaining to the patient that he is suffering from tuberculosis but that the disease is curable under proper conditions, the physician leads the patient to believe that he merely has "weak lungs," that he is "threatened with tuberculosis," or applies some similar term aimed to allay the fears of the sufferer. Perhaps the physician qualifies his summing up of the case with the remark that if his patient fails to take care of himself properly he will be in danger of breaking down with tuberculosis.

How Some Physicians Look at the Matter. The physician is thoroughly convinced that if the facts are placed before the patient in their true light, the latter will be caused much mental suffering, which will have a tendency to retard his recovery. Moreover, if the patient is suffering from fairly *early* tuberculosis, because

he feels and appears so nearly well, the physician believes that if he emphasizes the importance of radical combative measures, the sufferer will feel that the doctor is given to unintentional exaggeration. Thus, the physician points out, that once having lost confidence in his medical adviser, the patient will be apt to give little heed to subsequent directions and, in fact, will be quite likely to seek other counsel. In this event, the physician adds, it is fairly probable that sooner or later the sufferer will meet with another doctor—a doctor who, less well informed on the subject, assures his patient that his lungs are sound. Then, like more of us, ready and willing to accept the more hopeful view, the chance is large (continues the physician) that the deluded victim will eagerly pounce upon the last physician's words as conclusive proof that the fears of the first doctor were unfounded, and will cast care to the winds. Later, when forced to pay a penalty for each hour of delay, he may find to his sorrow that the day when a new lease on health could have been obtained at minimum cost, has slipped by unnoticed.

How plausible this explanation! Yet how often the story turns out otherwise: how often the warm hearted physician's well-meant camouflage fails to serve the purpose for which it was intended!

Nevertheless, tho the patient may subsequently have had a turn for the worse (which may have proved wholly disastrous), the physician may be entirely unaware of this occurrence, and is apt to go along for years, all the time assuming that his course has vindicated itself. So far as he saw before the patient drifted from his sight, the plan worked perfectly. So he has now reached the set conviction that through the use of a simple and harmless subterfuge, he held his patient under control and kept him always on safe paths.

Really Happens. That there is a grain of
this view and that such a plan works satisfac-
a few cases, is unquestioned. It is my firm be-
vever, anchored in experience, that concealment
chieves the hoped-for end, and that favorable re-
om this plan are quite exceptional. The fact
that in the immense majority of such instances
person cannot, or will not, see the necessity for
sufficient time and attention to his condition,
ıe realizes definitely that it is serious. He will
ere to a regimen that he may look upon as irk-
volving a sacrifice of some sort, unless convinced
is step is vital to recovery. **The knowledge**
has tuberculosis is the concrete proof that
s, ere he really puts his heart and soul into the

plan of withholding the facts be put into effect,
ıl sequence of events is this: For a limited time
lid carries out the program the physician has out-
True, he is apt to dilly-dally a good deal, but
e less he does modify his habits sufficiently to
measure of good. In this case he is almost sure
e some benefit—temporary tho it may be. Pres-
ıtisfied with the progress he has made, "patched
t by no means well, he allows himself to go with
rent, drifts away from his physician into the
ıs of indifference, and very possibly moves to
locality. Growing more and more apathetic, in
time he slips back into his old habits and, after a
ɔr shorter interval, finds himself again in the
of the malady—probably even more firmly in its
ıan before. More: when at last he discovers the
te of affairs, he is almost certain to blame his
ɔhysician for not accurately informing him.
ule holds good that the adult who has placed

his trust in a physician is, except under very extraordinary circumstances, entitled to the truth. This is so, particularly if the patient has tuberculosis specifically in mind when seeking advice; but the rule should also apply even tho the physician runs across the condition by accident—as it were—while making an examination for some other supposed difficulty. If the matter be laid before him in a plain tho gentle and kindly manner, the afflicted person will in the great majority of instances be far more likely to cooperate with his physician than if some vague or evasive and pacifying term is applied as a varnish to cover the actual events.

It is rare indeed that realization of the truth carries with it serious consequences. Often the patient is already suspicious. Suspense produces worry, for which there may not be the slightest basis. Moreover, it has been my experience that certainty either for or against tuberculosis usually brings relief. As the mist of doubt is wafted away the soul of the sufferer is warmed by the glorious sunshine of hope. His vision now clarified, he no longer hesitates in indecision, but resting easy in the knowledge that knowing the enemy half wins the battle, he proceeds to frame his plans accordingly—all the time looking ahead confidently toward ultimate victory.

The Protection of Others Is Another Reason Why the Sick Should Be Acquainted with the Facts. It is not alone for his own sake that the sick person should be acquainted with the facts. If he is to fulfil his duty to those around him, it is incumbent upon him to put into effect certain precautionary measures (described in Lesson III). He cannot be expected to do this intelligently, and probably will not do so at all, unless the exact nature of his ailment is placed before him. Here then, again, is further evidence that the straight fact is safest and best.

Tuberculosis Requires a Specialist

Taken as a whole, the facts just revealed justify the conclusion that tuberculosis requires the services of an expert. That this statement may not lead to a misunderstanding, it seems best to say promptly that this does not mean that it is always necessary or even profitable for one to put oneself into the hands of a physician who deals exclusively with this disease. Some physicians in general practice have been brought into intimate contact with so many cases of tuberculosis that they have become highly proficient in handling it. In this case, the fact that the physician's practice includes a certain amount of general work, often works out to advantage. Thus, the doctor's experience along parallel lines serves to balance his judgment when dealing with tuberculosis, and also aids him in meeting in effective manner any complicating illness of other nature which may perchance arise during his supervision of the case. Yet this is really the exception that proves the rule: **Unless one has positive assurance that the family physician also has a satisfactory knowledge of tuberculosis, so long as conditions continue as at present one will as a rule fare better by placing one's trust in the hands of a specialist on tuberculosis and allied conditions.**

In this connection it is impossible to emphasize too strongly the importance of consulting the best physician obtainable, even tho his services come high. Expert advice is a sound investment that will be repaid many fold in health, time and money. In order to secure dependable counsel, it may even be advisable for one to make a journey at some sacrifice. This holds true regardless whether counsel is sought for the purpose of obtaining diagnosis, or for treatment.

How to Be Sure that You Have Found the True Expert

You will ordinarily recognize the true specialist by the fact that he is unlikely to advertise (for advertising tends to make for commercialism at the cost of the patient's interests). Nor, especially, does he make glowing claims concerning the wonders that he can accomplish with some particular remedy. Rarely will he make a "snap" diagnosis. He is likely to inquire carefully into the history of the illness, into the invalid's family history, etc.; finally he will wish to make a thorough, painstaking examination of the chest (with clothing removed), and will perhaps desire to examine other parts of the body. He may ask the sick person to supply him with one or many samples of his sputum, and it may be necessary for him to repeat his examinations several times or to renew his questions. In some cases, he may be obliged to extend his observations over a period of one or several weeks. He may deem it advisable to apply a tuberculin test, or other tests, and it is not unlikely that he will wish to analyze the urine, to examine the blood, etc.

The real specialist who has the interest of his patient at heart will show a tendency to deliberate equally long before informing his patient either that he has been attacked by tuberculosis or that his fears are groundless. He will not make use of deceptive terms.

While in giving his advice he will employ a sympathetic tone, nevertheless he will be firm and insistent that his *definite* instructions be followed. Thus, for example, he will not merely say: "Oh, take things easy, sleep out of doors, and you will be all right." Instead, he will give pointed and minute directions regarding the daily details of his patient's life. Furthermore, in all proba-

bility, the physician will wish to keep his patient under continual observation, both for the purpose of himself studying the case closely, so that he may modify the regimen when circumstances dictate, and in order that he may make certain that his advice is carried out. Expressed in everyday language, the physician will usually be found to be "strong for rest," and it is very likely that he will wish his patient to go to bed for a longer or shorter, perhaps at the beginning, indeterminate, length of time. If, on the contrary, he says "get out and rough it," or fails to lay down an itemized program, particularly as relates to rest or exercise, you will know that he is not the right physician.

If in doubt as to the proper physician to consult, you may communicate with the secretary of the National Tuberculosis Association, 370 Seventh Avenue, New York, or put yourself in touch with the state society of similar title, with the state board of health (which in some states has a special bureau of tuberculosis) or with the secretary of the county medical society—any one of whom, if possible, will be glad to supply you with the names of one or more physicians having a thorough understanding of tuberculosis.

A Suggestion to Those of Limited Means. In the event that you are unable to meet the comparatively higher fee of the expert, you may perhaps solve the problem by visiting the station of the nearest Anti-Tuberculosis Society, where competent counsel may be obtained free of charge.

The Responsibility of Relatives and Friends

It is unfortunately true that a very large share of responsibility for the use of evasive and consoling terms must rest with the relatives and friends of the invalid, who have so frequently implored the doctor to hide the

facts from the sick person. How often it is that the well-meaning relative has drawn the physician aside, learned from him the truth and then requested, "But please don't tell him, Doctor; it will only cause him needless fright and worry."

As a rule the relative or friend has had but rudimentary understanding of tuberculosis and has failed to realize the great importance of the consistent and persistent application of each of the health measures.

More: he may even try to influence the patient in accordance with his own dim light, in a manner directly opposing the recommendations of the physician. As it is the sufferer who must bear the brunt of all mistakes, he has the right to receive the doctor's true opinion; if, then, a bad result ensues, the relative cannot be held to blame. Remembering the great importance of complete cooperation between the patient and physician, relatives and friends should at all times make sure that they do nothing and say nothing that by any possible chance may create the slightest misunderstanding.

A Suggestion to Those Who Wish to Help. Here there comes to mind a related topic which is so important that a moment of digression in referring to it may not be out of place.

The mental side of the question of recovery is exceedingly important, and financial worry has been one of the chief hindrances holding back indefinitely the progress of many a patient. The intense relief brought by the lifting of the burden of financial responsibility from the shoulders of the sick cannot be described; how far this boosts the invalid along the route to health, in certain instances, is almost beyond belief.

Only those who have felt the pinch of poverty while battling tuberculosis can thoroughly appreciate what it means to the one who is putting up the brave fight to

have someone step up to him and say: "My friend, you need concern yourself no more about finances, either for your family or yourself. I will look after this matter for you, and will see you through to the end, no matter how long it takes."

On his part, the invalid should never allow false pride to intervene and prevent him from accepting aid from those able and willing to give it. On their part, the friends and relatives can often earn the life-long gratitude of the ill person by assisting him *consistently and at the proper time.*

Those who really wish to do everything within their power for those whose condition will not permit them to do for themselves should so plan their efforts that they will be most effectual. They should understand that **the time when their assistance will do the most good is while the patient is still comparatively well and before his condition becomes critical.** Moreover, if their means permit, they should continue to extend the helping hand until the convalescent is able to support himself without endangering his health. The assistance should not be withdrawn when the sick person has been feeling and appearing well for merely a short time. It should be remembered that whereas outward improvement often comes quickly, true healing of the lungs is slow, and that the early appearance of health is largely superficial and actually marks a period of danger. If it is made necessary for the convalescing patient to jump back into work or in some other way to break away from the health program too early or too suddenly, he will be very liable to lose all or more than he has so far won.

A concrete case or two may serve to make the point clearer:

A young man whose personal resources were almost negligible but whose kin were well able to assist him,

was informed by a physician that he was suffering from advanced tuberculosis. Quite promptly the father of the young man paid his expenses on a trip west, and continued to support the son for a period of six months. Then, when the young man was just beginning to get on his feet again and was taking a new interest in life, without previous warning the father wrote, saying that he felt it was time for the son to begin to depend upon himself once more, so after another month he would send no more money to be spent in idleness! Doubtless the father meant well, but had not the slightest understanding of tuberculosis, nor did he appreciate the severity of the blow that such an announcement would mean to the son. The boy died three months later.

Another instance: A waitress in a hotel learned that she had been attacked by tuberculosis, but that the disease was not advanced and that under proper conditions the outlook was excellent. When she stopped work and adopted suitable methods to reclaim her health it was not long until the small fund that she had been able to lay away was exhausted. However, there was a wealthy aunt who at times in the past had helped the young woman to weather several financial storms. This aunt knew of the girl's illness but thought it was foolish for her to give up her work, because she appeared so nearly well; later, when the niece was advised to go to a sanatorium, the aunt felt that this was a pure money grabbing scheme and, altho she assisted the girl for a while, she felt all the time that the money was being expended needlessly. The upshot of the matter was that at the end of three months the aunt suddenly discontinued her assistance altogether.

Once more dependent entirely upon her own efforts for maintenance, the niece, who at no time had seemed very ill and who now appeared wholly restored to health

(tho of course she was not really well, for tuberculosis practically never heals within three months), found it necessary to resume her occupation. The sequence was that a year and a half later she was forced to make the fight all over—a fight which proved to be much harder than the first one.

In conclusion, let me offer this practical suggestion to those friends and relatives who are financially able to assist. **Offer your assistance early, and do not terminate it too soon.** Bear in mind that the day-to-day worry over doubt as to one's ability to withstand the financial strain next month or the month after has killed thousands; so if you can see your way clear at the outset to make it known to him who needs your assistance that you will continue to give it freely and fully until the convalescent has demonstrated degree by degree that he is fully able to again support himself, you will increase the chance for a successful outcome many fold.

How to Help Your Physician

While it is necessary for the physician to be frank with his patient, it is just as important that the patient be candid with his physician, so here it may be well to point out certain mistakes made by patients.

Certain persons, apparently proceeding on the assumption that the physician is bent on finding tuberculosis at all cost, to their own detriment intentionally conceal facts regarding the history of their family, or concerning their illness—or actually lie about them. This is indeed a foolish mistake. The problem is often quite difficult even for the expert, making it necessary for him to probe one's family history and to ask many questions concerning the opportunities for exposure to the disease, and relating to one's habits, living conditions, etc. Questions of this nature may appear trivial and uncalled for,

whereas they are actually in some cases of greater importance than the examination.

Another common error made by patients is the distortion of their financial status—the motive being the desire to avoid a heavy fee. Besides the fact that the true expert, who, usually after spending years in general practice, has done much extra work to fit himself for his specialty, is entitled to a commensurate reward to the extent that the circumstances of his patient permit—there is a real and decided danger in withholding the facts regarding one's financial resources.

The danger is that the physician will be led to modify his advice to conform with what he has been told about the size of one's pocket book. Out of consideration for the feelings of the afflicted person, the physician sees no good in giving instructions that he knows, or thinks he knows, in advance cannot be carried out, and which under these circumstances will only cause needless worry and indirectly work harm. Accordingly, the doctor feels called upon to modify his advice, and for this reason often cuts down on items of the treatment which the patient has great need of.

A mistake made by men of large affairs is that of impressing on the doctor that they must continue on the job. Directly or indirectly the physician is given to understand that the big man cannot give a long period to recovering his health. The physician is perhaps told in advance that a definite time limit must be set. In some instances he is led to believe that the business man cannot give up his work entirely even for a short time.

Doctors are but human, and when such limitations are made it is fairly commonly the case for the doctor to curtail the program considerably below the safety limit, or to fail to insist that the patient adhere rigidly to the schedule which the physician knows in his heart to be

best. Later, solely for this reason the rich man often reaps the harvest of failure.

In this connection it is sometimes said that the middle class victim of tuberculosis has the greatest chance because the rich man will not, and the poor man cannot, put into effect the regimen that is necessary. In recent years, thanks to the springing up of many semi-charitable or entirely free sanatoria for tuberculosis, and free dispensaries, the poor man's chance has been greatly improved; but the obstinacy or health blindness of the rich man still results in many unnecessary failures. The slipshod methods often pursued by men high in the ordinary walks of life in regard to their health, would not for a moment be tolerated by them if followed by one of their employees in a business way.

"O, if I Had Only Taken to Heart the Doctor's Advice!" Again, there are those who, governed perhaps by the importunities of their friends, or, giving way to their own inclinations, perhaps feeling that the physician exaggerates the seriousness of the case and that he is needlessly hampering their freedom—fall into the habit of continually begging the physician for additional liberties—repeatedly asking for permission to do this, that or the other thing—matters which have already been denied them. Even the best of physicians, after laying out a well planned program for his patient, may at last yield to this continual plaguing.

Each point yielded by the physician is usually a point lost by the patient, but he looks upon it as a point gained, altho his respect for the physician and his future willingness to abide by the physician's recommendations are lessened to just the corresponding degree.

Do I hear someone say: "Having once made a set of rules, the doctor should hold his patient rigidly to them?" In some cases *this may* be best, in others it

may be better for the doctor to yield a point rather than have the patient fret over the matter and waste needless energy working himself into a state of turmoil; for thus he may be led on into casting aside *all* care and wandering entirely out of the physician's control.

Physicians as a rule are anxious to respond to all reasonable requests, but the patient will help matters greatly if he will try to render himself content and make up his mind to settle down within the necessary limitations. This he can do, if he will only try hard enough.

Then there is another type of patient who, knowing full well that his physician does not want him to do certain things that he is doing, persists in doing the harmful things merely because the physician has omitted or forgotten to caution against them!

Others still there are, who, apparently holding the view that the physician is imposing tasks upon them merely for the fun of it, commit indiscretions on the sly. They consider that they are fooling the physician, when all the time they are hoodwinking and hurting no one but themselves. Perhaps no immediate harm ensues from these little delinquencies, so the deluded sufferer is led further and further from the mode of living prescribed for him. Too late, he awakens to the realization that all the time the disease has been making a slow, creeping advance. Too late, he learns that instead of fooling the doctor, as he had supposed, the disease has all the time been fooling him!

Physicians Usually Willing to Weigh Carefully All Reasonable Suggestions. Once having chosen a physician, if it is found difficult or impracticable to follow some rule he has laid down, or if it is felt that under the circumstances a different plan would be better, the physician is nearly always willing and glad to give careful consideration to sensible suggestions. The ultimate

decision should, however, be left to the doctor. True, the physician may occasionally overlook some point that may have a contrary bearing in the given case, but in the majority of instances his judgment will be sound. Let it be remembered, too, that it is the sum of good influences which turns the scales; that one harmful factor alone, one occasional slight mistake, is relatively unimportant. So, when little differences arise, if after interchange of views the physician fails to see the matter in the same light as the sick person, it is better for the latter to proceed in the way the physician has outlined and try to forget their differences, than to worry continually over the little uncorrected errors.

A Final Word. It is self-evident that small profit will be derived from the counsel of the physician, no matter how competent, if one is working at odds with him the greater part of the time. As just pointed out, the invalid should do his utmost to put himself in harmony with his physician. But if, after fair trial, it is found impossible for the two to keep in tune, it will probably prove best to break off the relationship entirely and to seek advice from some physician in whom complete confidence will be placed and with whom cooperation will prove pleasant and profitable.

LESSON VII

PLANNING YOUR RECOVERY

It is probable that every person whose health has been undermined by tuberculosis has had more than one friend who has suffered from the disease before him. Yet the probability is equally strong that heretofore he has gone along for years, confidently assuming that he would escape. Perhaps previously not having given the matter a serious thought, when the facts are exposed he experiences surprise, depression, and even doubt. Realization of the truth may come as a severe blow, and the first feeling may be that one's whole support has been taken from one.

Altho this feeling is natural enough, it is entirely uncalled for. Knowledge of the condition makes it no worse than before: a mere name changes nothing. The outlook is actually the more hopeful; because one is now in position to put up a successful fight, just as thousands have already done.

The Importance of Seizing the Psychological Moment

On discovery of the facts, there are some who are unconvinced that their condition is serious enough to demand attention; and so go their ordinary ways until it is perhaps too late. Others, stubbornly refusing to accept the inevitable, likewise persist in their accustomed mode of life, and let slip the opportune moment for obtaining, with relative ease, a complete cure without

nent crippling. So, it is often only too true that who can recover, will not; those who would recover, . Therefore, before electing to wait in watchful ancy one should realize that if this course is fol- later a ransom for the return of health far beyond ability to pay may be demanded.

Sufferer No Longer Considered an Outcast. In circles the old feeling still prevails that he who ting to redeem his health, in order to safeguard persons, must become a sort of exile, isolating f almost completely from friends and family. This which has a tendency to cause disheartenment at tset, is based on misapprehension. The facts are Altho the careless victim of tuberculosis definitely cidedly endangers those around him, the sick per- ho is careful is not a menace to others. Neverthe- he serious prosecution of health in the open air, ally during cold weather, does entail a certain t of separation from former companions; but this ely a distasteful necessity—not ostracism. Hence, e the conscientious patient is a safe associate, there occasion for him to feel that he is a "leper" and id companionship.

Sensible Attitude. He who calmly faces the who appreciates that the disease is serious but lso understands that under proper conditions it able, who, undaunted, at all times looks forward onfidence toward victory, will strongly insure his s for success.

heerful, optimistic disposition is a valuable asset, led extreme optimism does not lead to disregard e essential rules. Make up your mind, therefore, ou are going to win. Put aside the feeling that ds are so great that you are bound to lose. Re- r, no matter how serious your condition, how

black the future seems, others just as ill as you have faced as great or greater difficulties—have made the uphill fight—yet in the end have won. Try hard enough, and you will probably become convinced that you, too, will succeed.

If you are by nature pessimistic, by persistently exercising your will power you may be able to change your views. A will to get well, and the fighting spirit, coupled with a knowledge of the rules of the game and the willingness to abide by them, have saved many in a so-called hopeless condition.

Remember, also, that the more extensive a physician's experience, the less often he says that a case is hopeless or sets a limit to the time the sick person may live. Many are they who, sentenced to the grave in six months or so, by clinging to the doctrine "while there's life, there's hope" have pulled themselves back from the edge of the abyss and lived to help bury those who pronounced sentence upon them.

Yet if, after all, you continue to look at things through a dark glass, you need not feel alarmed over the matter; for experience has again and again proven that many a despondent, despairing soul, knowing "full well that recovery is impossible," has recovered despite these dismal forebodings.

The Future Rests Largely in Your Own Hands. In no other disease does the future depend so largely on the individual himself. One should be prepared to meet temptations and distractions on every side; then, if they do not appear, so much the better. A dogged spirit of determination to make all things conform to the single aim is of very great advantage. The sick person should make up his mind once and for all to steer an unwavering course, always straight ahead toward the beacon light—health; that he will not allow his better judgment to be

wayed by giving undue heed to the widely varying advice which will probably be offered by friends met with on either hand. Let it not be forgotten that well-meaning friends are responsible for thousands of deaths annually, and that it is just "when a feller needs a friend" most, that it is ofttimes impossible for him to rely upon them. If you have had the good fortune to have the real nature of your ailment determined while yet early, in all likelihood many of your dearest friends will insist that there is nothing seriously wrong with you, telling you time and again that you are wasting your opportunities. Unless you are quite evidently sick, do not expect much sympathy in your efforts to better your condition. Be prepared to hear folks say: "He's just a hypochondriac; of late he has developed into a regular loafer,"—"He certainly does like to take it easy,"—and many other things along the same order.

In your own hand rests the pen that may write either your death warrant, or sign your emancipation proclamation.

"Patent" Medicines and Vaunted "Cures"

Why You Should Avoid Them. Many so-called "cures" for tuberculosis—some of them advertised nostrums, others home medicines—for which remarkable results are claimed, will very likely be offered to you. Before deciding on taking such or such a remedy, it will be well to thoroughly weigh the fact that in the majority of cases the course of tuberculosis is irregular and accompanied by many periods of ups and downs. If a certain remedial agency is first taken or applied while the patient is on the down grade, and improvement follows, it is natural to give the new medicament or measure the credit. On the other hand, should the administration of the new remedy be begun while the sick person is in

fairly good condition, and he then grows worse, the tendency is to blame the remedy. Yet if a thoroughgoing investigation is made, it will be found in both instances that there is often no relation between the supposed cause and the supposed effect.

At the outset it should be understood that *both improvement and little relapses are to be looked for, irrespective of any treatment, and regardless of whether or not the ultimate result is good or bad;* if then, the expected upsets do not come, so much the better. It should be remembered further that these ups and downs can be altered by treatment only to a limited extent. If it is realized beforehand that many of these little ups and downs are necessary accompaniments of the working out or healing of the disease; that they are mere rough places on the road which will eventually lead the traveler onward to the destination of health—he will not feel greatly concerned merely because for a short time he seems worse, nor will he fall into the error of discarding some valuable measure solely because its use is followed temporarily by an increase in symptoms.

Why Testimonials Are Unreliable. The plain fact is that the tendency of the mind to link improvement—improvement which may in fact be spontaneous—definitely to an ostensible cause, to the medicine that has just been taken, is the explanation of the numerous, honest but nevertheless untrustworthy, testimonials concerning the supposed virtues of many a worthless remedy. In other cases the feeling of faith, or at least hope, with which the new medicament is taken up, helps to brace the sufferer, and indirectly to actually produce a turn for the better (just as homesickness and despondency may, on the contrary, produce a turn for the worse)—this peculiar trend of circumstances accounting in another way for the apparently marvelous benefit derived from the use of some of these ready-made "cures."

Where the Facts Regarding "Patent" Medicines May Be Obtained. The flat statement may be made that there is today no remedy that alone cures tuberculosis. It is rarely advisable to spend money on advertised remedies, especially on those for which highly colored claims are made. Certainly this should never be done on one's own responsibility. If you are contemplating the use of one of these hand-me-down "cures," you would do well first to write the United States Government, which has investigated many of them, or to the American Medical Association, 535 Dearborn Street, Chicago, for their conclusions.

Altho the claim is commonly made that many of these widely heralded "panaceas" are new discoveries unknown to physicians in general, the truth is that the active ingredients of practically all of them have on analysis been shown to be well-known agents, either long in use by the medical profession or tried and found wanting and discarded as worthless years ago. Many of them are "shot-gun" mixtures containing many ingredients put together with the hope that one of them may perchance hit a mark—that is, relieve some symptom. The other constituents may not be needed in a given case, and may even do direct harm. The most that can be said of the best of these ofttimes extravagantly praised remedies, is that it may serve to alleviate the cough or to bring about amelioration of some other symptom; whereas the same symptoms can in all likelihood be relieved in a more effective manner by the physician in charge, who can fit his treatment accurately to the concrete case.

At All Events, Be on Guard Against Neglecting the Essentials. The worst feature of the patent medicine habit is that the sick person may learn to depend so fully upon the particular remedy he is taking that he

will be led to neglect the really essential features of the health program. For this reason, if you *will* use one of these remedies—be it a home remedy or one of the advertised nostrums—above all, you should make absolutely certain that the spending of money in this manner does not make it incumbent upon you to pare closely the primary measures; make sure, therefore, that you carry out unfalteringly the schedule for recovery you have laid down for yourself.

Methods of Treatment

In order that one may build one's plans for the future intelligently, it seems well to consider for a moment the principal remedial agencies worthy of use in tuberculosis. Inasmuch as no remedy that will promptly cut short this disease has been perfected, the fight against it must for the present continue to be an indirect one, in which measures that serve to build up the vital power of the body so that the soil is rendered unfit for the growth of the germs, occupy first place. Remembering that an improper or unhygienic mode of life, plus certain other influences that undermine the vitality, are the main background causes that permit the seeds of tuberculosis to develop, measures capable of opposing these vitality-sapping factors at once suggest themselves as effective weapons. Recalling that *wrong living* is the outstanding cause, and continuing the same line of thought, one quite naturally assumes that *right living* would furnish the antidote. So it has proven; for to the present day, right living constitutes not only the strongest bulwark for forestalling the onset of tuberculosis, but at the same time it is the most powerful weapon in the fight for overthrowing the malady.

That one may not be misled, before passing on it should be understood that altho right living is the key

to both prevention and cure, the significance of the word is not the same in the two instances. Let us see now what the term, right living, means, as applied to recovery.

The A-B-C's of Recovery—Nature's Remedies. Put into service against tuberculosis, right living signifies that there should be obtained in appropriate amount: (1) *rest,* both mental and physical, (2) proper and sufficient *food,* (3) that one live in the *fresh air,* (4) in a *suitable environment,* and, if practicable, (5) in a *favorable climate.* In addition, one should endeavor to avoid all complicating ailments—ailments which are but too liable to heap fuel on fire.

Looked at from another viewpoint, the aim is to save energy in every way possible and, when necessary, to supply the body with additional energy; and to support and guide and so direct Nature's efforts that they are kept constantly concentrated against the disease.

Tho the Remedies Are Simple the Dose Must Fit the Needs of Each Person. Thus roughly sketched, you have in hand the essence of success; it is for your physician or yourself to supply the details to fit your own case.

Because the measures useful against tuberculosis are for the greater part so simple and commonplace, a quite general opinion is in circulation that one need give little or no study to the matter before attempting to apply them in one's own case. This is a serious error, which has led again and again to mishap. Tho the remedies be simple, it is of the utmost importance that they be applied with discernment, and that the dose be gaged to meet the requirements of each person.

Error to Attempt to Follow in the Footsteps of Others Who Have Recovered with Little Effort. The fact that some persons have obtained a renewed and

firm grip on life, tho making little or no change in their habits of living, has done harm. While, expressed in percentage, the number who have recovered in this manner is small, it is true that here and there one who has suffered from even quite advanced disease has obtained complete and permanent victory, with little or no effort. *Those who have thus recovered at small cost to themselves often do much damage by advising others to follow a similar plan—a plan which in the great majority of instances leads only to failure.*

Here then, a cautioning word seems timely against believing that *you* can do and can stand what another individual withstands, merely because you are *apparently* in the same condition. It is essential that you keep to *your* limit. The true guide is the way in which you, yourself, react to each undertaking. In passing, it may well be urged that this rule be incorporated into your tenets of health throughout life.

A Competent Physician a Valuable Asset

It is but reasonable to suppose that a physician who has guided others past the quicksands of deception and led them on to victory will be of great help to you. Such a physician can best analyze your case and decide on the precise dose of each remedy—be it Nature's remedy or an actual medicine—which should be administered. Whether or not you will require medicine, in the everyday use of the word, may be left for him to determine. (The probability is, however, that some medicine will be required for one purpose or another during some part of the treatment; and it should be understood that the appropriate medicine, used at the right time as a supplement to Nature's efforts, often proves life-saving.) Under ordinary circumstances the health plans will of course be worked out in conjunction with your physi-

cian, but if it is absolutely necessary to do your planning without assistance it is believed that in the following pages you will find satisfactory outlines for your guidance.

How to Frame the Program for Your Future

Acknowledging at once that one's condition is serious, one should set about the redemption of health in the same business-like manner that would be devoted to everyday affairs. At the outset it is highly desirable that a definite plan of campaign be mapped out—a plan that can be carried out without interruption to its ultimate conclusion.

As a preface to laying out his plans, it is advisable for the sick person to make a careful census of his finances; his temperament; the exact condition of his health; and of all other influences that may by any possibility have a bearing on the decision. While all unnecessary delay should be avoided, a short time given at the beginning to carefully threshing out each question, is not to be looked upon as wasted; provided the result is the formulation of a workable policy which one will pursue to the end.

False Economy to Use Half-way Measures.* If you wish to make sure that your application for health will be honored, do not go about the matter in a half-hearted way. Nowadays, since tuberculosis is known to be less often fatal than was formerly supposed, it is common for the sick person to remain at home and to carry on at least a part of his ordinary business affairs at the same time that he is seeking health. Usually only a half success is to be expected from these rather half-

* This does not mean that every case requires measures of the same degree. For example, if the condition of the patient calls for absolute rest in bed, it would be worse than a waste of time to attempt to make a short cut by resting only a little. Conversely, if the condition is not sufficiently serious to require continuous rest, then the sufferer will best serve his interests by resting only so much as his case demands.

hearted efforts. Altho half-way measures are quite commonly of some benefit (tho but temporary, as a rule) and in more rare instances lead to a complete rejuvenation, it is unwise to cut down on any part of the treatment unless this course becomes imperative. When dealing with a disease in which, no matter how slightly ill one may be at the outset, there is no way of accurately foretelling whether victory will come easily or only after a hard fight, is it not logical to apply every useful weapon in each case? (Those who suffer from early tuberculosis and who are unconvinced of the necessity for such steps, if they have not already read Lessons I and V, are advised to do so now.)

On Making a Sacrifice and Arranging Your Affairs. Sacrifices of some nature are usually necessary. If these relinquishments are postponed from day to day, in all likelihood the giving up will grow correspondingly more and more difficult. The best plan, then, is to make the sacrifice promptly—to take the plunge and have the matter over with and out of mind. A sick man is at best a poor workman; is it not then both an economy of finance and health to drop everything else, if practicable, to the end that health and efficiency may be regained in the shortest time possible? Of course you wish to make the first fight the final one. So make every reasonable effort to lay all else aside and to put your affairs in order so that while "taking the cure" you will have no other interests to distract your attention and perhaps wreck the whole undertaking.

A Suggestion to Those of Limited Means. At this point a word of encouragement to those who feel that they are handicapped by a slender pocketbook may not be amiss. If it is impossible for one to adhere strictly to the rules, it should by no means be concluded that for this reason all chances are lost; what should be done

case is to follow the schedule as closely as prac-
and remember that a little more perseverance
ally if combined with pluck) may make up for a
ite laxness in following the routine.

, too, persons thus unfortunately situated may
themselves by bearing in mind that they have
vantage over the other fellow—the advantage of
lost their health while living under very poor
ons. Thus, whatever slight changes they are able
e in the daily conduct of their lives is by com-
quite large, and for this reason more likely to
cient. By way of illustration, it may be recorded
e observation has been repeatedly made that those
health has broken down while living in crowded
nt districts, by merely obtaining good food and
rate amount of sunshine, of fresh air and of rela-
t, can often achieve a most happy result. There
o free or semi-charitable institutions open to the
or, in many communities, they may obtain com-
medical advice at one of the anti-tuberculosis
aries; again, perhaps, they may avail themselves,
of the services of a nurse skilled in treating tu-
sis. (The National Association for Tuberculosis,
venth Ave., New York, issues some very helpful
tions listing and briefly describing the institutions
spensaries for tuberculosis, both public and pri-
the United States and Canada.) False pride
never be allowed to keep one from making the
these opportunities.

ELATIVE IMPORTANCE OF THE HEALTH MEASURES

ithstanding that one may wish otherwise, cir-
nces over which one has no control sometimes
he cutting down on some phase of the treatment
ry. When this is true, it is essential that one

have some knowledge of the relative value of each phase of the health regimen, in order that it may be made certain that the sacrifice is made on one of the less important items.

First and foremost, understand that only as a last resort, or when very extraordinary conditions arise, should one curtail the amount of rest taken. Nevertheless, in rare instances it may be advisable to reduce very slightly the amount of rest, provided that in this way a considerable amount of time may be added to the period given for recovery, or if one may be enabled to procure an adequate quantity of good food which otherwise would be unobtainable. Under exceptional circumstances of this nature, if the patient will spend his time in sitting, and lie down *whenever possible,* this may be the lesser evil, and in the end prove a winning program. Even so, this plan is preferably avoided unless the sufferer is only slightly ill.

As has just been intimated, too strong emphasis cannot be placed upon the necessity of making provision for obtaining a sufficient quantity of wholesome food. (This does not mean that the patient must "stuff" himself—see Lesson X.) Food is to be regarded as one of the prime essentials. In addition, of course, it is highly important that one obtain at all times one's due share of fresh air, but as there is seldom occasion for anyone, anywhere, to be miserly in the use of this free remedy, the necessity almost never comes for cutting down on this important item.

The Influence of Environment

The importance of a suitable environment for "taking the cure" cannot be dwelt upon too often. Let it be added, however, that conditions exactly suited to one person may prove intolerable and wholly unfavorable for

another. On the whole, the best place for each individual is the place that makes it easiest for him to get completely away from the old and faulty ruts of living; and that makes it easy and natural to fall into healthful habits. For the majority, in my estimation, this requires a wholly new mental atmosphere—an absolute break in the old associations, this in turn requiring an entire change of surroundings. In other words, I believe that most patients will fare better away from the old home, in some new environment where the surroundings are congenial and pleasant; where, away from temptation and distraction, one's neighbors and friends are probably more fully informed on tuberculosis, so that it becomes easier for one to do the right thing. For this reason, irrespective of the value of climate (climate itself being briefly discussed a little later in this lesson, and fully in Lesson XII), I believe that many patients will best serve themselves by moving to some of the better known health resorts.

As noted above, of late there has been a growing tendency for the invalid to remain at home while seeking health—despite the fact that the home may be located among very poor surroundings in a crowded city. For some, of course, home treatment is best, but for others it has been the direct cause of failure. So, unless there is good reason for doing otherwise, I feel that in most cases the sick person will materially add to his chances by seeking a wholly new environment.

Will You Go to a Sanatorium? Experiences have proven that in many cases it is impossible for the sick person to obtain satisfactory conditions either at home or elsewhere outside of a sanatorium. When this is true, one of the many well-conducted institutions for the exclusive treatment of tuberculosis and kindred infections may prove a most precious boon.

Fears That Are Ofttimes Groundless. If it seems best to make a sanatorium one's temporary home, one need have small fear of failing to find contentment therein. On the contrary, it is usually found that the relief from the cares and anxieties of the household, the complete release from the worries of business, and the privilege of securing what are perhaps the first moments of complete relaxation that have been enjoyed for years, as one sinks back on a soft bed and resigns oneself to letting others do the work—serve to create a totally unexpected and most gratifying feeling of utter contentment. Here it will be found that each part of the day is taken up by some feature of a well-thought-out program, designed to prevent time from dragging on the hands—with the spirit of which one readily falls into line.

Members of the frail sex who shrink from taking up their abode in an institution should give heed to the fact that it has again and again been proven that women especially are likely to find peace of mind and solace in a sanatorium.

Again, there are those who fear that they will be brought into contact with others more ill than themselves, and that this will not only prove disagreeable but will distinctly endanger them. This feeling, too, is entirely uncalled for; as a matter of fact, the invalid just coming into a sanatorium is as a rule rather astonished to find that most of the patients seem apparently well. At all events, the very sick ones are separated from the others and are in bed, so that ordinarily one does not become intimate with them until they, too, have taken on at least an appearance of health. Far from being a place where one is liable to contract the disease or to add to one's trouble, experience has again and again demonstrated that the sanatorium is the safest place one *can be.*

ven a Short Stay May Prove Helpful. Altho a
t residence in a sanatorium is worth little for per-
ency of health so far as the results obtained dur-
the period spent in the institution is concerned, yet
when the environment elsewhere is entirely satis-
ory, a visit to an institution of this kind, for even
ort time, is usually of inestimable benefit in an in-
t manner. In the sanatorium the sick person will,
ast, learn fairly well how to care for himself, after
h he may, if necessary, carry on the treatment in
other place.

Resolution to Make. Whether the sojourn is long
ort, it should be understood that full cure is not
ined until some time afterward. So those who "take
ure" in sanatoria will do well to form the firm
ution that they will give their full cooperation when
eriod for exercise and building up arrives, and that
will make the most of every opportunity for pre-
g themselves to cope with the living and working
itions that will be met with on taking their de-
re.

e Sanatorium Not Suitable for All. When, how-
all has been said in favor of the sanatorium, the
remains that for a certain number it fails entirely
ovide the right environment. Some there are who
a fixed abhorrence for an institution of this char-
, and while within its portals continually fret and
y and make trouble for themselves and others. If
persons can find an agreeable environment else-
e, the probability is large that they will fare bet-
way from the sanatorium. Other objections that
y in certain cases could be mentioned, but this will
e to show that the sanatorium is not suitable for
nd that the temperament and other factors must be
ned with before arriving at a decision.

A Final Word on Choosing the Place for "Taking the Cure." Everyone knows what an immense influence for good or bad our state of mind has on each and every one of us. Who is there who does not recall the "all-in feeling," the "don't-care attitude," the loss of appetite, the poor digestion and the sleepless nights—that result from great grief, fright, homesickness, or some other intensely depressing emotional influence? On the other hand, what a charm have faith, hope, love, joy and contentment, in rekindling the fires of life, strength and happiness! These are all matters of common knowledge. During sickness it is but natural that the effect of our mental processes, in one direction or the other, will be even more decisive. Remembering, then, how important it is to keep the mind in as continual a state of cheer and uplift as possible, so that whatever power it has to rule the body will be helpfully exercised, the endeavor should be to carry out this principle in choosing the place where one is to sojourn for health reconstruction.

The Question of Climate

Climate is to be looked upon as a valuable adjunct to recovery, but as less essential than rest, food, fresh air, and the element of time. Again, it is far more important that the sufferer carry out the health program in a suitable environment, than it is that he seek the benefit of a favorable climate. Likewise, the counsel of a physician who fully understands tuberculosis will be worth a great deal more than will the mere fact that the invalid takes up his residence in one of the "good" climates. Expressed in a word, each of these things contributes its share toward right living, and it should be remembered that, as the saying runs, "How one lives is more important than where one lives."

Still, if one can apply *every* measure that offers benefit, including climate, so much the better. So, as some change of residence is usually desirable in order to afford a freshness of surroundings, and since it is usually much easier to carry out the health program where others are doing likewise, in making the change of residence (unless there be some sound objection to this plan) why not move to a health resort in a more favorable climate—thus adding one more building stone to your house of health? In this connection it is well to remember, also, that many will not adhere to the rest-fresh-air program in a cold, disagreeable climate, yet will do so in a warmer climate. As faithful and *prolonged* observance of the health regimen is of prime importance, the decision for or against a change of climate may in some cases hinge on this point. Other items weighing for or against climatic change will be mentioned in Lesson XII.

Time the True Healer

It is impossible to accentuate too strongly the importance of the rôle of *time*. Altho when feasible it is desirable to make use of all measures and means at one's command, it is just as imperative that a plan be adopted which can be carried out for an adequate length of time. That one may not experience the keen feeling of disappointment and disheartenment that a relapse would bring, it should be understood that even tho the disease is still in the so-called incipient stage, lasting results can seldom be obtained in less than six months, and a longer period will often be found necessary. Those suffering from more advanced disease will probably require a year or two, and, not uncommonly, several years, if the malady is to be forever conquered. In the past the mistake was often made of advising patients of scanty means to make a long trip for climatic benefit, or of

counseling them to enter some expensive institution—procedures that produced so heavy a drain on the finances that it was often necessary for them suddenly to cut short their stay or to skimp on other essential items.

"How Long Will It Take, Doctor?" In the preceding lesson it has been shown how, in former years especially, certain physicians have been led to underestimate the time necessary for complete recuperation, and have unwittingly given their patients erroneous and wholly misleading answers when asked the question, "How long do you think it will take, Doctor?" Placing complete reliance in the doctor's advice and taking the arbitrary time allowance he had set at its face value, the patient laid his plans accordingly. With the elapse of time, when the period allotted to recovery had ended, irrespective of whether his condition on that date was good or bad, he was forced to break off the routine prematurely and rather suddenly, and to fall back into the old rut of living.

What was the result? Too often it was a relapse—perhaps even irretrievable failure.

Well to Avoid Setting a Fixed Limit. Many and many who could have won, have lost—simply because they discontinued their efforts too soon. With this fact etched in the memory, and remembering also that when a time estimate is given by a most expert physician, even then circumstances may arise that will make necessary the lengthening of the time allowance, one will do well to avoid fixing any set limit to the period allotted to recovery.

After the earlier steps in the treatment have been carried out sufficiently long to bring the sick person back to apparent health, it is even then advisable for him to defer all work for several months or longer—perhaps

for a year or more—during which he builds himself up into as fit a condition as possible (see Lesson IX). Later, when he actually gets back into the harness, whatever work is undertaken should be taken up by degrees, and for many years the plan of taking periodical vacations at frequent intervals should be religiously observed. If this procedure is followed, the percentage of permanent results will be high.

A Final Word: **First and last—make it a point to see that you do not short-measure yourself on this cheap yet priceless element.***

* Only those who have watched a large number of patients make the fight against tuberculosis can really appreciate the vital importance of the time factor. How often have I seen patients who, on learning that they have tuberculosis, hurriedly, almost frantically, take up the fight, which they wage with intense vigor until they have taken on an appearance of health and are on the verge of again coming into their own. Then, believing victory assured, they cease their efforts and go along in indifferent fashion until time brings a relapse. Again the fight is taken up in hit or miss fashion and waged hysterically for a short period. Once more the relapse comes; once more the fight is resumed—only to be dropped again just as victory comes barely within sight. And so their efforts are continued indefinitely—efforts which in the end prove wholly fruitless. Such persons, and there are many of them, are convinced that tuberculosis is incurable because they have not learned the lesson that *only by the continuous prosecution of a well-thought-out plan of campaign over a long period of time can one obtain assurance of a real and lasting victory.*

LESSON VIII

HOW NATURE HEALS

THAT one may be prepared to put up a winning fight, it is necessary for it to be understood that the mode of healing in tuberculosis is quite different from the manner of healing of many other diseases. For instance, as a result of a successful battle against scarlet fever or smallpox, all the germs within the body are destroyed; thenceforward, the individual enjoys almost complete freedom from liability to another attack. On the contrary, after recovery from an outbreak of tuberculosis, *provided the mode of life is unchanged,* on the average, one is more liable than ever to break down with tuberculosis.

The reason for this is that in many cases healing is not accompanied by the destruction of all the germs of the disease. Many of the germs are killed, but others are merely imprisoned within the body, where they may linger for a long time, perhaps during the rest of life. Thus, altho the individual is apparently well and vigorous, and able to take an active part in useful affairs, nevertheless, a repetition of the same influences that favored the original attack may cause another outbreak.

A Word of Encouragement. Before proceeding further, it may be well to add that nothing herein is to be construed as meaning that tuberculosis is not really curable. Quite the contrary, the purpose of these paragraphs is to furnish convincing evidence that while healing is generally a slow process, yet if patience is exercised, one may usually look forward to a complete

and lasting victory. If it is appreciated how Nature accomplishes her ends, by imitating and supplementing her methods, and assisting her in every way possible, success may be insured.

Partial Healing Often Spontaneous, but Complete Recovery Usually Requires Definite Effort. Quite curiously, tuberculosis has a tendency to heal spontaneously, with absolutely no effort on the part of the victim. Unfortunately, however, the repair wrought in this manner is in the majority of cases only partial. Many there are, who, at one time or another during life, unknown to themselves have acquired at least a *trace* of tuberculosis, which later has healed completely and permanently, without their having at any time become cognizant of the fact that their bodies provided a refuge for the tubercle germs. So, too, in a few instances, when the disease has become so pronounced as to produce manifest disturbances of health (*evident* tuberculosis), especially in the cases in which the malady has not progressed beyond the so-called first or minimal stage, complete healing has occurred—without change in the mode of life, and without treatment of any nature.

Moreover, even in far advanced cases *some* evidence of spontaneous healing is nearly always to be found. Nevertheless, when once the malady has obtained so firm a grasp upon the individual as to produce noticeable influence on the well-being, altho even then Nature makes an *attempt* at healing, *as a rule she fails to complete the process, if unaided.* In this case, likewise, a partial arrestment often occurs spontaneously and lasts for a longer or shorter period. Yet too often after a few months, or a year or two, of comparative health, some intervening factor serves to make the soil again fertile, or to awaken the slumbering bacilli, and a fresh breakdown is the result.

Futility of Prophecy. Furthermore, even in the early stage, there is no way of prophesying with certainty, in which cases the disease will, and in which it will not, heal of its own accord or with little effort. The mildest cases may develop into the worst, and vice versa. This merely emphasizes that *in all cases full advantage should be taken of every weapon known to be useful against tuberculosis.*

Nature's Four Methods of Repair

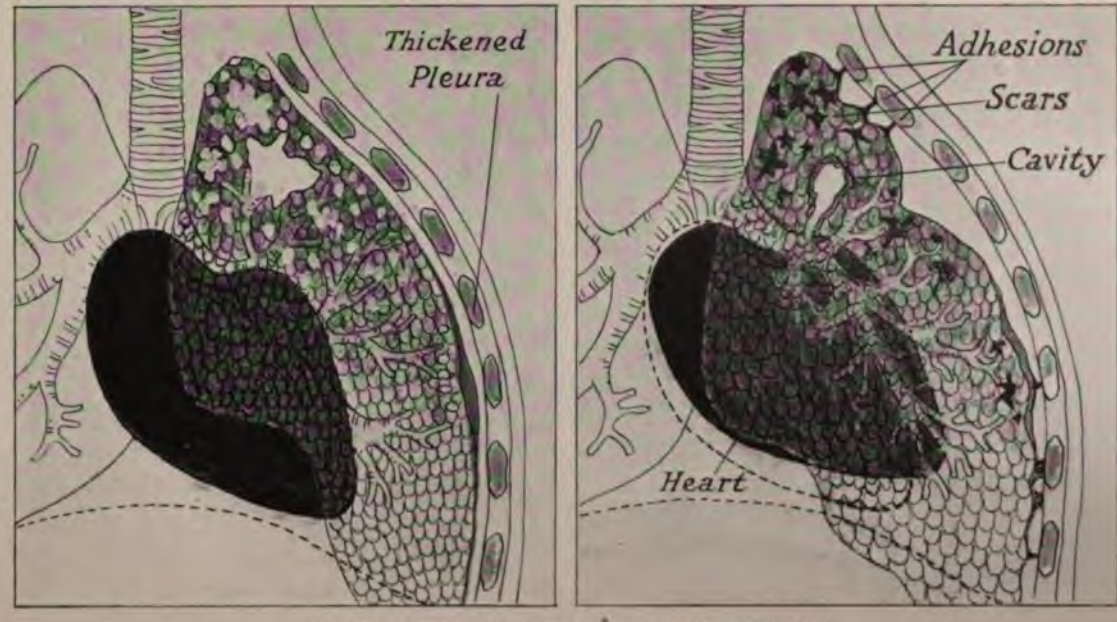
Briefly stated, Nature proceeds to repair the damage done by disease in several different ways, now to be described:—

1. Complete destruction of all germs; no evidence remaining

The germs may be all killed and the cells composing the tubercle reabsorbed into the blood stream or removed to some other part of the body; in this case little or no evidence of the germ invasion remains. Such a termination is uncommon, and usually occurs only when a small area has been affected.

2. Healing by scar formation and pleurisy

Scar Formation. Again some of the bacilli are killed, others weakened; part of the tubercle is absorbed; around and within the remaining portion Nature builds a restraining wall of scar (healing tissue—sometimes called *fibrous* or *fibroid tissue*)—thereby, as it were, penning up or imprisoning the germs that she has been unable to kill. The newly formed healing tissue is at first extremely delicate, and very easily destroyed; but as time goes on, the at first frail threads are builded into a firmer and firmer wall of scar. Like scars elsewhere, as they grow older, the scars built in the lungs



ILLUSTRATING THE HEALING OF TUBERCULOSIS

On left, a lung is shown with tuberculosis in its upper part, the gray masses representing tubercles. An irregular cavity is also shown. Farther down, on the surface of the lung, the lining or pleura is thickened. In the diagram on the right, the tubercles have been replaced by scars (healing tissue), and a lining of scar tissue covers the surface of the cavity, which is now smoother and beginning to shrink. The contraction of scar tissue has also caused the surface of the lung to dimple in between the pleural bands or adhesions. The lower part of the lung is somewhat enlarged as a partial compensation for the destroyed portion. Note also how the heart has been drawn to one side.



have a pronounced tendency to contract and to occupy a smaller space; but the destroyed lung substance is never replaced by new functioning air cells.

Evidences of Nature's Foresight. Here, however, is seen another instance of Nature's beneficence. She has supplied the body with an overabundance of lung tissue; hence one may live an active, unhandicapped life even tho a considerable area of one or both lungs is put out of commission. In fact, one may live with only one sixth of the lung capacity remaining. Furthermore, even tho a large part of Nature's reserve equipment of lung tissue be destroyed, there comes into play another favorable factor. For, while the scars are becoming firmly set, other adjustments are taking place. For one thing, the air cells in the relatively sound portions of the lungs are enlarging (very gradually, it is true)—a process which enables them to do more than their accustomed amount of work, and to compensate to a considerable extent for the efficiency lost by the crippling of other parts. Meantime the heart and other organs are recovering from the strain imposed upon them and adapting themselves to the new conditions, and taking on the additional functions made necessary by the shifting of their positions, etc. (soon to be described) incidental to the loss of a certain amount of lung tissue.

Nature's Work Is Done Slowly. It is astonishing what ravages Nature will repair, if she is only given sufficient time. It should be understood that even in early cases a year or two, or three or more years, are required for the scars to become thoroughly cemented and for the other compensatory adjustments to take place. During this time the convalescing patient usually feels so well that he is very likely to overtask himself and undo all the good that has previously been wrought. The exercise of a little patience and the willingness to

continue to hew closely to the line during this period, is often the deciding factor on which hinges the whole future welfare.

Healing of the Lungs Like Healing of a Wound on a Tree. The scars that form in the lungs are very similar to the rings of compact, hard wood often found surrounding nails or other foreign bodies that have become imbedded in trees. As the scars in the lungs become firmly set, they are apt to bring about peculiar distortions of the surrounding tissues, such as one sometimes sees on the face of some unfortunate individual whose features have been disfigured by the shrinking of the large scar-like bands resulting from an extensive burn. The contraction of scars in the lungs frequently produces odd, star-like formations within the substance of these organs, and peculiar puckerings or dimples upon the surface. The scars may also block the entrance of air into nearby healthier air cells, hindering their functioning, and even causing collapse of large sections of the lungs.

Owing to the fact that in health each organ of the body is connected at one or more points with the organs or parts immediately adjacent, it is obvious that small influences may disarrange the orderly scheme whereby each organ fits into its own nook or corner. If one organ is disturbed, neighboring organs are apt to be disturbed also. Thus, the shortening of large masses of scar may make in time so strong a traction on a nearby organ that it is drawn into, and firmly bound down in an entirely new position, and the performance of its ordinary duties may be seriously interfered with.

Healing by Pleurisy. At some time during the course of tuberculosis, the surface of the lungs (that is to say, the pleura—the lining covering the lungs and the inner surface of the chest wall) is very likely to become

inflamed. This is the more probable if the tubercles are located near the surface. If pleurisy occurs, the pleura may be simply roughened, like sandpaper; but in other instances a sticky material is secreted which, here and there, causes the lung to adhere to surrounding parts, including the chest wall. In some cases the gluey substance gradually solidifies and in turn becomes hard and scar like in character, so that in places the pleura is now covered with a dense encrustation (pleural thickening). Where the pleura has become adherent to other organs or parts, the setting of the gluey material results in the formation of definite bands joining the lungs to the adjacent tissues (pleural adhesions). By preventing undue expansion of the diseased areas, these adhesions promote local rest, and to this extent are to be looked upon as favorable to healing.

Thus pleurisy is shown to be, in part at any rate, an indication of the effort of Nature to protect herself. Even the pain that quite often accompanies pleurisy, which is ascribable in the main to the rubbing together of the roughened, sand-like surfaces, seems at times to serve as a friendly warning against too deep breathing, which would interfere with Nature's repair work.

How Nature Sometimes Overdoes Things. Now and then a case occurs in which as a result of pleurisy, a large amount of the gluey material, or a thinner liquid, is secreted, which to a greater or less degree fills the pleural space ("water on the lung" or pleural effusion). Like the dry pleurisy just described, and the band-like pleuritic adhesions, the fluid thus formed is sometimes a definite aid to the sick person. Through mechanically compressing the lung this organ is relieved from its accustomed round of daily duties and given opportunity for recuperation. In other cases, however, influences that are ordinarily beneficial may become so *pronounced as to definitely* hinder recovery.

Unfortunately, such instances are common enough throughout the whole range of Nature's handiwork. The knitting of broken bones furnishes a case in point. Shortly after the injury has occurred, material for repair is deposited around and between the broken bone ends. This new material is at first soft and jellylike, but gradually hardens and finally takes on the characteristics of genuine solid bone. In order to make sure that the supply of this repair substance (called callus) is ample, Nature usually manufactures more of it than is actually required. This surplus callus occasionally does harm by interfering with the action of muscles, with the movement of joints in the neighborhood, and so forth.

Quite similarly, the scar-like pleuritic thickenings or bands sometimes prove positively detrimental, just as does excessive scar formation in the lungs. So, too, pleural fluid may develop in an unnecessarily large quantity, and through pressure or otherwise, produce decided difficulty in breathing, and other disagreeable or definitely hurtful effects. In such an event, the ordinarily conservative process becomes an actual menace, and in some cases relief must be given by drawing off some of the fluid (tapping).

3. HEALING BY CHALKY DEPOSIT

In addition to building a barrier of scar around the germs, Nature sometimes endeavors to make their imprisonment more certain by depositing in and around the tubercles a mortar, or lime-like substance, which eventually hardens into a firm, chalky or cement-like deposit. The so-called "lung stones," which are occasionally coughed up by patients, are really larger or smaller particles of this chalky deposit. These stones often contain live germs which are in this manner once and for all eliminated from the body.

4. HEALING BY CAVITY FORMATION

small or large excavations that develop in the lung
esult of softening of the tubercles are to be looked
as a step along another route that in time leads
ling. When in any spot the disease has progressed
that Nature is unable to kill all the germs, or to
replace the tubercles with scar, she does the next
hing. There is some reason to believe that at this
Nature herself completes the softening of the tu-
s—converting them into a semi-liquid material,
is passed off in the sputum. **Certain it is, that**
rmation of a cavity is in many instances a step
d the end, the end being recovery. It will be
herefore, that while a cavity is not to be particu-
desired, it is a great deal better than no healing

avity Virtually Outside the Body. In the heal-
a cavity, scar formation again assumes a promi-
ôle. A restraining wall of fibrous tissue, which is
t delicate and easily destroyed, but which in time
es a compact, thick, more or less spherical ring or
f scar, is degree by degree thrown up around the
. With this much of Nature's work completed,
the cavity—the hole in the lung—is still in exis-
yet inasmuch as it communicates with a bronchial
for practical purposes it may be regarded as out-
f the body. Hence, even tho the discharge may
ue for a long time, it finds outlet right at hand,
e chance that the poisonous material may leak into
culation and be distributed throughout the body, is
a minimum.

scar around the cavity shows the same inherent
cy to contract that scars do elsewhere, so as time
the originally large and jagged, irregular-walled

excavation is squeezed upon, and, as the shrinking process continues, if all goes well, is gradually reduced to a small, smooth-walled, comparatively dry cavity. As time proceeds, it may even become completely dry, so that the expectoration ceases entirely. If the cavity is small, the continued progressive building up of the scar tissue, followed by its contraction, may ultimately lead to the complete obliteration of the excavation.

Transformation of the Cavity into a Bronchial Tube. In still other instances, after the cavity has become small and dry, the mucous membrane of the neighboring bronchial tube may grow and spread, and, little by little, inch its way along, until it finally creeps into, and forms a lining for, the walls of the cavity. In effect, the cavity then becomes merely an extension of the bronchial tube.

Explanation. Nothing in the foregoing paragraphs is intended to imply that the continuation of expectoration necessarily means that the cavity is not completely healed. Altho it is unusual for complete healing to take place while the expectoration continues, yet this does occur in certain instances. In these cases some expectoration (which does not, however, contain tubercle bacilli) continues for a long period after the lung damage has been entirely repaired. In such instances, the expectoration may be kept up by a simple bronchitis—a bronchitis which was perhaps initiated by the continual irritation of sputum passing out over the delicate lining of the bronchial tubes, by frequent or prolonged coughing, or some similar influence. However, if tubercle germs are found in the sputum, this always indicates the presence of a cavity (or an ulceration—a saucer-shaped concavity). Nevertheless, unless the cavity is sufficiently large to be detected on the examination of the chest, or by the X-ray, it is usually *disregarded*.

Persons with a Cavity Not Necessarily Handicapped. If those who look upon a cavity with dread would hold fast to the fact that the formation of a cavity is in some cases the only method by which the disease may be eliminated, they would very likely experience a profound feeling of relief. He who has a well walled-off and fairly well shrunken, tho not completely dry cavity, is simply put to the trouble of extending slightly his morning toilet. After a short while, one usually learns the trick of clearing out the discharge with very little effort, and with little or no cough, so the morning house-cleaning becomes an easy habit. To-day, thousands of persons in just this condition are going about constantly, apparently well, conducting their business in a perfectly normal manner. Moreover, throughout the land there are individuals (totaling a fairly large number, altho only a small fraction of the whole population) in whom the disease has gone on to cavity formation without the true cause—tuberculosis—having been recognized.*

Further, those who harbor a cavity, have the satisfaction of looking forward to the day when the expectoration may entirely cease and the cavity become forever closed.

Why Healing Is Often Incomplete and Relapse Common

Like members of the human race, Nature, too, has her frailties. Thus, when undertaking a task, she has a strange tendency to overexert herself at first and to do even more than is necessary; after which, not uncommonly, she early relaxes her efforts. Almost everyone

* Some of these persons have made no definite effort to recover their health, yet at last the disease has become arrested spontaneously. However, these are merely the exceptions that prove the rule that tuberculosis demands intelligent, systematic and prolonged management and treatment.

is familiar with some example of this strange trait of Nature.

Who has not at some time injured his hand and afterwards noted the new formed healing tissue in the wound—tissue built up in so large an amount that it actually protruded above the surface of the surrounding skin (proud flesh)? Who has not helped to trim the useless sap-suckers from trees in the spring? These are but two everyday illustrations of the often prodigal, sometimes harmful, expenditure of Nature's energies. Conversely, like the racer who makes a spurt past the grandstand for effect on the onlookers, Nature, after making a preliminary good showing, has a tendency to lie back on the job and (seemingly thinking that in making a good start she has done enough) to loaf and let the work "go to the dogs." As will now be explained, this very human twist in Nature's make-up is the cause of many of the waves of ups and downs that mark the course of the white plague. (In certain instances these oscillatory waves recur with singular regularity at intervals of from one to three weeks.)

Once Nature has succeeded in building up a barrier of protective cells and scar around the invading germs (so that few germs and little poison escape into the circulation to keep the defensive forces of the body as a whole constantly aroused to fighting pitch)—it is not long as a rule until, consoled and misled by a false feeling of security, Nature seems to tire of the contest and allows her efforts to practically cease. In the meantime the germs are fighting for their very existence. As time goes along, they multiply and their forces grow stronger, till eventually they may succeed in breaking through the restraining wall. Inasmuch as the protective army has been in large part recalled from the seat of action and mustered out, the body is caught unpre-

pared, so that even tho its disintegrating forces be promptly rallied, the probability is strong that the germs will have made at least some advance before Nature can again gain the whip hand. In this manner, first one side and then the other acquires control of the situation—and the battle continues indefinitely. Each advance of the germ army corresponds to an extension of the disease—made evident to the sufferer by the addition of some new symptom, or by the increase in severity of one or more of those from which he already suffers. Each time that Nature gains the mastery, the disease becomes quiescent, and the afflicted person enjoys a season of comparative health.

Proof Furnished by Everyday Incidents. He who doubts that Nature is often like the dilly-dallying workman may perhaps convince himself by recalling one of his own past experiences. If one has at any time carefully observed the healing of a superficial wound caused by some chance accident, it has been noticed, perhaps, that within a few days new skin began to form around the edge of the wound and to creep in toward the center, until presently a large portion of the denuded area was covered. If one continued watching, one was perhaps surprised to find that **the closure of the last half of the wound required twice or even three times as long a period as was consumed in repairing the first half.** Yet if, as chance would have it, before the first wound had mended completely, one was unfortunate enough to have the skin scraped off the injured member in some neighboring spot, shortly afterward it was very probably noted that (in spite of the quite evident slowing up of healing in the first wound) this fresh wound had already begun to heal quite *rapidly*.

Horticulture furnishes another convenient illustration. If a limb be sawed off a tree or a slice taken off

the bark and substance of the trunk of the tree, after a very short interval a rounded edge of new-formed wood begins to grow in from the edges of the wound. For a time, the new wood continues to grow rapidly until a large portion of the defect is covered. Then, at this stage of healing, for apparently no reason at all, the process of repair slows up, and in some instances ceases altogether. Thus, altho Nature may have plenty of latent power, yet in the absence of a *continual irritation* of some sort to keep her energies awake, she often fails to make full and proper use of it.

A Key to Treatment. These incidents are not only interesting, but have pointed the way toward the more effective treatment of the disease. The surgeon who is treating an indolent, sluggish wound, such as a chronic leg ulcer, aims to keep Nature's energies constantly applied to the task of healing—by applying an irritant, such as lunar caustic, to the wound at opportune moments. So, in tuberculosis, the skilful physician has an opportunity not only to assist in conserving the resources of Nature, but by suitable means he endeavors to support her efforts and to so direct her energies that they are kept always concentrated on the work in hand. (See discussion of tuberculin treatment in Lesson XV.)

The Significance of "Colds" in the Course of Tuberculosis

In connection with the ups and downs of tuberculosis, there is one point not commonly understood, about which it seems well to say a word or two here. When the case is progressing favorably, altho ultimately complete victory probably will be won, yet in the meantime one or several or even many temporary upsets, which at the time may appear to be serious backsets, may occur. Owing to the fact that at these periods the cough is liable

to be exaggerated, the expectoration freer and the fever higher (or perhaps one or more of these symptoms may be present only at this time), the patient may feel that he has taken "cold." As a matter of fact, difficult as it may be to believe, a certain number of these flare-ups, resembling colds, are actually but outward evidences of Nature's efforts to rid the body of the disease. In other words, these manifestations are apt to occur at the very time that Nature is spurred on to a more vigorous fight. If the patient will look upon these occasional outbreaks as perhaps of beneficial nature, rather than construing them all as relapses; if he will bear in mind that a certain amount of cough and expectoration are necessary for the elimination of the germs; and that the fever and other symptoms are often merely inevitable tho disagreeable accompaniments of the process of healing—the little inconvenience and distress experienced at these times will be much easier put up with.

Ever remember that the pathway to health is by no means always smooth; that it may even be roughest of all just before the tape marking the victorious end of the race is crossed.

LESSON IX

ON REST AND EXERCISE

Some persons still hold fast to the old belief that exercise is the essence of the cure for tuberculosis. Others are just as firmly convinced that rest is the password that opens the gateway to health. As a matter of fact, as is usually the case, the middle ground is the safe one to tread. These two opposite agencies are both valuable remedies. Each fills its own place of usefulness, in which neither can supplant the other. Rest, *for repair,* is needed mainly in the first half of the treatment. Exercise, *for endurance,* will probably be required later.

As the subject unfolds, we shall see just what is meant by each of these terms, as applied to disease of the lungs.

Why Rest Is Necessary

Rest aids recovery in two ways, both by its salutary effect on the body as a whole, and upon the lungs. During rest there is a minimum expenditure of energy, and the amount saved is concentrated in the fight against the disease. Both mental effort and physical exertion require an output of strength or power; so mental and physical rest are both important. Moreover, rest in the reclining position, owing to the influence of gravitation in augmenting the quantity of blood in the lungs, serves to bring the healing elements in larger amount into direct contact with the diseased tissue, in this manner promoting repair.

Again, when one is at rest, the call on each organ for work is lessened; on the lungs this local effect is particularly important. Nature's newly formed healing tissue is as delicate as a spider's web, and is as easily injured. Almost everyone has observed that the continual scratching or irritation of a sore on the surface—on the arm, for example—delays healing; and has learned from experience that the injured member is made useful again much more quickly if it be given protection and rest. But it is not so well known that rest is just as good a medicine for the sick lungs. Complete rest of the lungs can of course never be obtained; but when the body as a whole is at rest, the depth and frequency of the breathing is lessened and cough is diminished. Thus the new threads of healing tissue are protected; and the chance of spreading the disease, by inhalation of the germs into other areas, lessened.

Proof That Rest Is Valuable. How many there are who, tho they would not think of using an automobile with a broken cylinder, persist in driving the human machine at a time when its need for rest and repair is equally great. It is well known that the knitting of a broken arm or leg is facilitated by any means that produces rest of the part. Moreover, tuberculosis of the bones and joints has long been treated by fixation in a plaster cast, or by some other form of immobilization. It is also quite generally recognized that nearly all other diseases are benefited by rest. Why then is not a similar method applicable to tuberculosis of the lungs?

Nature herself has supplied the answer.

Almost every case of tuberculosis presents near the seat of the disease some evidence of thickening of the pleura (the pleura is the thin glistening lining or membrane covering the lungs and the inner surface of the chest wall) or pleural adhesions, which bind down the

lung to a greater or less degree. These bands and thickenings restrict the motion of the diseased parts (as explained in Lessons IV and VIII) giving rest and quietude and promoting healing.

Again, in certain cases, fluid accumulates in the pleural space—that is, between the lung and the chest wall (pleural effusion)—and compresses the lung. thereby in another manner limiting its expansion; the interesting observation having been made that this phenomenon is sometimes followed by more rapid healing. Similarly, when as a result of a certain peculiar accident or complication which occasionally occurs in the case of tuberculosis, air gains access to, and to a greater or less degree fills, the pleural cavity, causing collapse of the lung (spontaneous pneumothorax) healing is not uncommonly given a definite push forward.

These illustrations and discoveries all suggest that rest is of value, but the final "proof of the pudding is in the eating": the multiplied lessons of experience justify the statement that rest is indeed the great restorer.

General Instructions for Resting

No fixed standard as to the precise amount of rest necessary can be given; but all persons suffering from active tuberculosis require some rest. On the whole, the amount needed is governed by the exact condition present in the lungs of each individual; but the state of the heart and other organs—each and all affected indirectly, to a greater or less degree, in tuberculosis—must also be reckoned with as controlling factors. As these matters can be accurately determined only by a thoroughly competent physician, they will not be taken up in detail here, altho suggestions along this line will be given in a later paragraph.

***The* Six-hour Man and the Sixteen-hour Man.** To

a certain extent, also, rest is a relative factor; the conditions under which the breakdown in health occurred having some bearing on the amount of rest needed. For example, an extreme case may be considered: Of two men ill in like degree, the one who lost his health while working six hours a day would probably require more rest than the one whose health failed while he was working sixteen hours a day. If the sixteen-hour man simply stopped work and sat around a considerable portion of the time, he would perhaps obtain as much *relative* rest (that is to say, as great a change from the conditions under which he was working at the time his health failed) as the six-hour man would obtain by going to bed.

However, this illustration is to be interpreted as indicating that if circumstances rendering it impossible for one to secure complete quiet and repose arise, or if other important influences militate against the use of a large amount of rest, one may still hope for a favorable outcome, rather than as furnishing a definite guide to the precise amount of rest one should take. In other words, in the case cited, the probability is that the sixteen-hour man, too, could improve his chances still further by seeking absolute rest for a time. Moreover, if he has much cough and expectoration; or more than, say, one-half or at most one degree of fever; or if he shows in other ways that he is materially sick; or if, in the absence of these factors the disease is known to be at all extensive; or again, if, tho small in extent, the disease is progressing, unless overruled by some exceptional state of affairs, rest in bed, for a short period at least, is almost indispensable. In such a case, whether or not rest in bed seems necessary for the conservation of *general* energy, it *is* necessary for the purpose of affording *local* rest—rest of the disabled organ—which is also *highly important.*

Rules for Rest*

1. Rest When Fever Is Present or When the Disease Is Progressing. When the malady is making headway, one should usually be at absolute or complete rest. (Definite instructions for obtaining complete rest will be given in a moment.)

Ordinarily, progress of the disease is marked by fever, which is the most accurate single guide, from the standpoint of the one who is sick, at any rate. Hence, fever is the most frequent indication for rest. Note: One should not, however, make the mistake of permitting the presence or absence of fever to be the sole criterion. It is necessary for it to be thoroughly appreciated that in certain cases the disease may continue to make further and further inroads, despite the complete absence of fever, even as recorded by the thermometer. It is even true that in some cases fever may not be noticed throughout the entire course of the disease.†

For this reason it is essential to remember that the occurrence of any other sign that the disease is gaining ground also calls for rest; and that *some persons with a strictly normal temperature require rest even more urgently than others having a low or moderate fever.* Ordinarily, observation combined with a

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* These rules refer to rest *in bed*, barring certain exceptional circumstances, to be noted on later pages. In those not uncommon cases in which the fever recurs only at intervals, one should make it a point to rest when the temperature is on the up-wave.

† (1) If the resisting forces of the body are at low ebb, there may be no fever, or the temperature may even be below normal, notwithstanding the steady onward march of the disease. Again (2) occasionally, if the focus of disease is well localized by a firm wall of scar (healing tissue), the poisons may not escape into the general circulation, to be distributed throughout the body; hence there may be no fever, altho the area involved be quite large and the process be at least fairly active. (3) In fibroid tuberculosis (described rather fully in Lesson V, p. 125) fever may not be detected throughout the whole course. Then too (4) the freedom from fever in certain cases is explained by the fact that the body develops a quite pronounced tolerance (a relative immunity) to the poisons; hence, in this case, even tho the poisons seep out from the seat of disease in considerable amount, fever may be entirely lacking.



ON THE ROAD TO HEALTH

Rest—usually rest in bed—is a first essential in conquering tuberculosis. Many persons are convinced that they cannot really relax and rest if they go to bed, and that if they "do give up" and force themselves to stay in bed, they may never get up again. This patient thought likewise, but the picture was taken when she had been in bed seven months. She does not seem to have grown weaker, and notice how happy and contented she is.



MAKING HASTE SLOWLY BUT SURELY

These patients have progressed to the point where they can safely sit up for a few hours each day, yet unwise undertakings could easily undo all they have gained. They are enjoying life and feel able to do considerably more than they are allowed, but are willing to make haste slowly in order to win *permanent* victory.



le judgment will suffice in many cases to tell one
en the disease is progressing, and that additional rest
herefore demanded. Other hints in this direction
l be given a little later.

'ever due to outside influences also calls for rest and
oes without saying that fever due to causes entirely
elated to tuberculosis may occur now and then.
ertheless, such incidental rises of temperature may
ald a serious complication, which can often be cut
rt by rigid rest instituted at the outset. In any
nt, the rise of temperature probably indicates the
et of some new development that calls upon the body
put up a stronger fight, for which additional output
energy is demanded. Hence, the rule should be:
t whenever fever is present, be the cause what it
y.

'he feelings are not a trustworthy guide to fever and
obtain reliable information on this point *it is essen-
that the thermometer be used.* (For a definition
l description of the normal temperature, for instruc-
ns on using the thermometer, and for further illumi-
ion on this topic, the reader is referred to Lesson
pages 131 and 132.)

. **Rest When Fatigued or Feeling Badly from Any
use.** A tired feeling is Nature's signal that the
it of the body's resources is being approached or
already been overstepped. This notice one should
er fail to heed. It is obvious, therefore, that all per-
s who are weak or manifestly sick should be at rest.
hen one is ailing, let the reason be what it may, rest
lmost certain to be of benefit, and will forestall many
set-back. The inviolable rule to rest when tired
out-of-sorts from any cause, should be instituted at
e outset.

Often the patient is met with who, when he grows
a

tired, is willing to rest for a short time, or until he has become refreshed. At once, however, when he begins to "feel fit," he wishes to walk about or take up some other form of exercise. True, this patient has saved enough energy so that he no longer feels ill effects from lack of strength and power; yet he really needs to continue the saving of energy until a reserve has been accumulated, against call for it in the future. In the words of one famous physician, George E. Bushnell, retired colonel of the U. S. Army, "Whereas he much needs a bank account, he acts like a child who must spend his penny as soon as he receives it."

So, do not be afraid to treat yourself generously in the use of rest. *Try to anticipate the onset of fatigue by seeking rest before becoming noticeably tired. Also, when already fatigued, make it a point to remain quiet longer than is necessary to relieve the immediate tired feeling.*

3. Rest Whenever There Is the Slightest Tinge of Blood in the Sputum. "Safety First" demands that you go to bed promptly whenever a trace of color appears in the sputum (unless you are otherwise advised by a competent physician with whom you are in personal touch *).

It is true that many who persist in moving around, despite the continual spitting of blood, escape serious results; yet many others do not escape. Through a brief rest at this time, profuse hemorrhages and serious, perhaps fatal, consequences can often be averted.

* Now and then a case of blood-spitting occurs (a certain type of "congestive" hemorrhage, marked by the raising of merely splotches or small amounts of blood) in which a little moving about is allowable, and may prove beneficial. Yet, as the question whether or not the blood spitting is of the congestive type can be settled only by the skilled physician, usually it would be foolhardy for the sick person to attempt to decide the matter and to begin moving around a little on his own initiative. Bear in mind, too, that at most one is merely allowed, as a rule, to sit up or perhaps walk about the room a little, and that even these liberties are to be undertaken very cautiously.

4. Rest When You Take "Cold." If this simple formula were made a part of the code of every sufferer from tuberculosis, and implicitly obeyed, a long step would be taken toward sealing the doom of this scourge. Many and many a victim of the disease, already glimpsing the day when he would be able to say to himself, "I am well and whole again," has had his hopes crushed irretrievably, solely through catching "cold" and failing to care for himself properly. This is indeed a time when one should "watch his step."

Almost everyone knows that the quickest way to rid oneself of a cold is to put aside other matters and go to bed for twenty-four hours, or for a few days or longer, as need be. Yet how many there are who defer doing so from day to day, in the hope that the infection will run its course without injury resulting. It is true that in some cases the cold does finally wear itself out, with apparently no serious harm done, even tho no attention be paid to it. On the other hand, in too many instances, the fire of the disease in the lung is fanned into violent blaze, and a setback occurs that may require months or years to overcome. Often the signs denoting that the disease is making a new start are so slight and so little if at all different from the ordinary accompaniments of the cold itself, that one is wont to put off "giving up to it," as commonly expressed, just a little longer, to "give the cold a few days more, or another week perhaps, to wear itself out"; while all the time the old trouble is getting a firmer and firmer grip upon one.

One who has previously been well can possibly afford to procrastinate in dealing with a cold, but there is only one safe procedure for those afflicted with tuberculosis to follow. It is this: When you find that you have been unlucky enough to contract a cold, *go to bed at once,* and stay there until you have good reason to

believe that the infection has burned itself out; then get up *gradually.*

Let the other fellow laugh if he will. Just let his bantering remarks pass in one ear and out of the other; meantime resting serenely in the knowledge that you are doing the wise thing.

It is important that all tuberculosis patients follow this plan, but it is *doubly important for those who have at any time spit blood.*

5. **Rest During the Menstrual Period.** For women who are up more or less at other times, additional rest at the time of the monthly flow is strongly to be advised, the more so if one's past experience has shown that the symptoms are inclined to be more severe at this time.

6. **Rest When the Heart Is Very Rapid.** Regardless of other factors, a pulse rate above 110 when one is quiet nearly always requires a continuation of absolute rest. This rate is to be looked upon as the extreme permissible limit for merely the slightest amount of exercise even under exceptional circumstances (unless contrary advice is given by an understanding physician closely supervising the case): ordinarily, a much lower pulse rate calls for complete rest, even tho all other factors are highly favorable.

How to Obtain Complete Rest

The actual carrying out of the scheme of rest referred to in the preceding paragraphs implies that **the patient is to undress, go to bed, and remain there until circumstances arise that justify him in getting up.** Whether or not he gets up to make his toilet or for meals, depends upon the precise conditions that exist in the individual case. Ordinarily, the difference may be split by having the meals served in bed, at first getting up only for the short time necessary to attend

to other wants. If, however, the fever is high, or if the patient is evidently quite sick, he should remain in bed constantly. This will, of course, necessitate the use of a bedpan.

Every thing that consumes energy is to be looked upon as exercise, and is to be avoided except when exercise is permissible. One should assume a comfortable position—a position in which the body is not supported by muscular effort at any point—all the muscles being thoroughly relaxed and at ease—lie as quietly as possible, avoid turning frequently, and refrain from making sudden movements of any kind; being particularly careful to use the arms and shoulders as little as possible. When lying on the side it is well to rest on the side that makes for relief of cough and ease in breathing, and for general comfort. This is a good rule to follow when the lungs are nearly equally affected, but *if the disease is definitely worse on one side, it is frequently helpful to lie on this side as much as possible. By commencing with a few minutes daily and with continued practice it is often possible to accustom oneself to resting on the worst side a number of hours daily—even for the greater part of the time. This plan is well worth a persistent effort, and will not rarely turn the scales in Nature's favor.*

Business matters and anxieties of all kinds should be put aside; letter writing, long or animated conversations; boisterous laughing, prolonged reading—especially the reading of exciting stories, or reading that calls for deep thought or study—and other things tending to prevent mental and physical quietude, should be cut to the minimum or wholly abstained from. Temporary laziness should be cultivated. "Early to sleep" should be the motto; the aim being to obtain the maximum amount of sleep in each twenty-four hours.

The Advantage of Massage. If it be necessary for the patient to remain in bed over a long period (and no complications, such as blood in the sputum, exist) daily gentle massage of the body will add much to the feeling of well-being, and in other ways serve a very desirable end. (Directions for giving massage are to be found in Lesson XIII.)

The Importance of a Daily "Rest Hour." It is important for those who are able to be up most of the time to regularly observe a two-hour rest period after the midday meal—say from one to three o'clock, or from two to four, as circumstances dictate. This "rest hour" serves to divide the day into two parts, and to make a complete break in things, and should be set aside as a period during which one endeavors to do nothing. As a rule, even reading should be laid aside and complete relaxation of the body and mind should be sought. One should try to sleep, providing that sleep during the day causes no material interference with rest at night. Those who are confined to bed all the time should seek even greater quietude and relaxation during this period.

Rest As an Aid to Digestion. Just before eating, rest holds an especially large influence for good. The digestion of food uses up considerable energy, and we all know from experience that at times weariness has a tendency to take away the appetite (altho in other instances weariness induces an actual craving for food or drink). If, notwithstanding the tired feeling and the loss of desire for food, a full meal is eaten, one may suffer for so doing. This teaches that rest for half an hour or more before eating allows the body to store up power against the call for the additional output of energy that will come at meal time. *If the stomach is at all sensitive, rest before meals is doubly important.*

When Talking Should Be Forbidden. When the

voice is weak or husky (whether this be due merely to a referred influence from the disease in the lung, as it often is, or to actual tuberculosis of the larynx or voice-box, but particularly in the latter case), rest of the voice is especially important. It may be well in such instances to speak only in whispers—if at all—and if tuberculosis of the throat is present, this is imperative. So, too, in cases wherein the act of speaking noticeably provokes a spasm of cough, rest of the vocal chords is again of more than ordinary importance.

In the treatment of tuberculosis of the throat, patients are often restricted to *absolute* silence for as long a period as may be necessary, and through adding merely this simple measure to the health regimen complete healing of the throat has frequently been brought about. More recently we have learned that in severe or obstinate cases of pure lung tuberculosis, irrespective of the presence or absence of voice symptoms, silence often proves remarkably beneficial. I have had a number of patients who after all else had failed as a last resort were advised to observe strict silence and to use a writing pad. Those who were faithful for weeks or months were not rarely rewarded by seeing the whole course of events change, and by eventual victory.

The Voluntary Restriction of Cough. As already noted, the act of coughing has a tendency to destroy Nature's delicate thread work of healing tissue and to spread the disease to parts of the lungs previously free from trouble; so every effort should be made to restrain all cough not necessary for raising the secretions. It is surprising how much it can be controlled, if one will only try. There need be no fear that the intentional restriction of cough will hinder the elimination of the sputum (unless the sputum has already become so thoroughly loosened that the slightest effort will serve to

remove it). If the cough be restrained, much of the sputum is involuntarily carried upward, and is readily removed merely by clearing the throat.

Importance of Sexual Rest

There is one phase of the subject, Rest, to which too little attention is paid by the average patient. I refer to sexual rest. From the study of the preceding pages it is apparent that the avoidance of excitement and the strict conservation of both the physical and vital energy are all-essential to recovery. The sexual act flies straight in the face of these things. It is the very opposite of rest and in addition brings about a most undesirable condition of excitement, and may bring on a hemorrhage. What is *most important and least apparent,* it uses up a material amount of energy—energy which is very badly needed for other purposes.

There is no question that the chances for recovery of a good many persons have been lost solely through sexual intercourse. For those in health, it has been conclusively proven within the last few years that neither abstinence nor moderate indulgence is in any degree harmful. But with sickness, particularly tuberculosis, the entire situation changes. For a patient who is running fever, or who is confined to bed for any reason, there should positively be no intercourse. When one is on the road to recovery and can stand a reasonable amount of physical activity without rise of temperature, fatigue or other untoward sign, intercourse may usually be permitted provided it is held down to an absolute minimum.

In this connection a word to the other partner of the union may not be amiss. Too often the husband or wife, in perfect health and abounding with energy, quite fails to realize the harm that may accrue from so simple an act. If the well partner will remember that the fight

against tuberculosis is a fight for life, he will at all times make certain that he says nothing and does nothing that directly or indirectly may tend to raise the absolute minimum which the patient establishes. This may be a sacrifice, but it is a sacrifice that is distinctly necessary and distinctly worth while.

Unwarranted Fear of Rest

There is an opinion prevalent that if the sufferer from tuberculosis goes to bed, he will become weaker and weaker, until finally he may never be able to get up and about again. A more serious mistake can hardly be made than to permit one's actions to be governed by this belief. It is more nearly correct to say that, if despite the fact that the invalid's condition calls for a rest he persists in staying up and around, he will become so much worse that eventually he will be forced to go to bed. Then, truly, he may never get up again because he has waited so long that his condition has become hopeless.

Fear of Rest Is Unwarranted. True, when one who for some time has been working under a continual strain and daily overdrawing on his fund of strength, is put to bed, and the matters that have occupied the mind and diverted his attention are laid aside, he may for the first time awaken to the fact that he is completely worn out. It is then rather easy to fall into the error of assuming that the rest in bed has been the direct cause of the weakness; whereas the fact is that the removal of the false strength of nervous excitement has merely served to reveal the state of affairs previously existing.

Still, there is a grain of truth in the belief that as a result of remaining in bed over a long period, one loses a certain amount of strength or muscular power; but commonly an erroneous interpretation is placed upon this fact. When the muscles are idle it is but natural

that a certain amount of wasting from their non-use, accompanied by a corresponding loss of power, should become manifest. None the less, unless the period of rest is exceedingly prolonged, the loss is more apparent than real. That is, the ability to coordinate the muscles is diminished, but actual energy is stored up, and a substantial bank account accumulated against the probable demands of the future. Even those who are healthy commonly experience the same harmless feeling of weakness as a result of rest.

For this reason, if debility comes on as a result of rest in bed, there need be no concern. Later, when with practise the knack of walking is reacquired, in all likelihood the temporary feebleness will be displaced by renewed vigor. Remember, however, that just as a child requires time to learn to walk, a certain interval for re-education of the muscles must necessarily elapse before the previously latent strength becomes evident.

For those who are well, excessive rest no doubt means rust, but it is also a fact that they, too, would avoid much sickness by occasionally seeking at least relative rest and relaxation.

Rest versus Nervousness and the "Blues"

In deciding on the exact amount of rest necessary, the temperament must be given due consideration. The nervous, fretting, fidgety individual who is continually brooding and chafing while under restraint, may defeat the very object of the whole scheme by preventing himself from obtaining sufficient mental rest. Temperaments of this nature, sufficiently strong to have a contrary bearing against rest, are however not common. True, nine out of ten persons *think* they are the exceptions, and give voice to their beliefs in some such expression as, "I have never had a sick day and have always

led a busy life: I know that I cannot remain quiet and relax, while in bed." Yet after giving the plan a fair trial for a week or so, most of these pessimistic persons are surprised to find that they *do* obtain relaxation and repose, and see for themselves that rest is very beneficial.

As a rule, if the invalid will only make up his mind to accept the conclusion of the highest authorities that rest and repair go hand in hand, and once and for all convince himself that rest is what he needs, he will become contented and secure the full benefits of rest. **Experience has demonstrated that rest itself is often the best remedy for nervousness. Often, too, those who fight hardest against rest are the ones who need it most.**

For those who are prone to worry and fret, the following simple expedient, suggested by the noted medical authority, Colonel Bushnell, of the U. S. Army, often proves helpful. Just select some particular time in the day as a "worrying hour," in which you are to do all the worrying you desire; try pooling all the worries for the whole day in this period, and you may be agreeably surprised to find not only that it is impossible to force yourself to worry at the set time, but that you are less and less inclined to worry at other hours.

Other helpful suggestions for doing away with worry, despondency, fear and dread will be given in Lessons XIII and XIV.

Wading-in versus the Bold Plunge. Not uncommonly, those who abhor the idea of going to bed make some such appeal as the following: "Doctor, I have lived with myself for a good many years, and I feel sure, therefore, that I know myself as you cannot. If I do as you wish, and go right to bed, I am confident not only that I will not gain, but that I will actually lose. May we not compromise? If you will be satis-

fied to have me sit around most of the time and lie down an hour or two each day, I believe that I can change my habits to that extent, with benefit. But if you force me to remain in bed constantly, I am sure that I will only worry and brood, lose heart completely, and fail in the end."

When a patient speaks in this manner, if I am convinced that the circumstances as a whole call for absolute rest, I am accustomed to answer in this vein: "There is, of course, logic in your plea. Yet if you will once consent to immediately relinquish everything that holds you back, promptly cutting all unnecessary outside ties that hinder you from focusing your attention exclusively on your recovery, you will almost certainly be the gainer. Please remember, too, that once you have made up your mind to accept the inevitable, it will probably be easier for you to find peace of mind and contentment while in bed than it will if you put only half your heart into the fight, and enlist merely half-way measures in your cause. If you are only lukewarm from the start, the partial liberties will probably but serve to add to your discontent and perhaps lead you to cast aside all caution and care.

"Now be a good sport and take the plunge boldly. Have it over with at once, and you will soon find that rest pays."

Modification of Program Sometimes Desirable. Nevertheless, in a few instances some allowance must be made for the extreme mental restlessness and despondency that develops when one is under forced restraint. In such instances, a slightly modified program may give better results.*

Yet if rest is otherwise called for, the fact should

* In this case one may find recuperation in variety and change of experience, which prevents exhaustion of one group of nerve cells, rather than by complete rest of the body as a whole.

not be lost sight of that if a way can be found to put oneself at ease, firm adherence to the rest schedule one has previously worked out for oneself will continue to be the better plan.

How Long Should Rest in Bed Be Continued?

When fever is present, a week, a month, or many months may pass before a decided fall in the temperature becomes evident. It is usually wise for those who respond readily to remain at rest in bed until the temperature has become normal (this means, in most cases, until the temperature stands at 98.6° F., or below—see Lesson V, p. 132, for a more complete description of normal temperature), and for a sufficient time thereafter to obtain reasonable assurance that the fall is permanent. In some instances quite a long period will be required for the lowering of the fever and one should not be discouraged if the drop in temperature does not take place quickly; for in many cases of this type the ultimate results are most gratifying.

Whether or not it is best to persist at absolute rest *after* having reached the conclusion that the temperature has come down to stay, depends upon individual circumstances, concerning which only a suggestion can be given here. If in doubt, one can never go astray by falling back on the time-worn but nevertheless trustworthy maxim that so long as one keeps on mending at a fair rate of speed (as shown by the abatement of other symptoms), unless there be some strong reason for doing otherwise, it is usually a poor policy to interrupt the treatment that has been responsible for these good results.

If, in the given case, fever has been absent and the necessity for rest has been based upon other factors (as indicated earlier in this lesson) the decision as to re-

ducing the amount of rest must depend mainly upon the abatement of these factors. So long as any signs indicating that the disease is making headway remain, rest is in order, unless some circumstances, such as those now to be discussed, make desirable a modification of the program.

Circumstances That May Necessitate Modification of the Rest Schedule. Should (1) the decline of fever, or (2) the abatement of activity of the disease (in those cases where other items than fever have furnished the basis of rest) occur very slowly or not at all, it is sometimes inadvisable for one to adhere exactly to the regimen of complete rest until (a) the precise normal temperature is reached or (b) until all activity of the disease has ceased. Altho if other things are going well, it is often desirable for one to remain at rest in bed even in such cases.

Ordinarily, improvement in digestion, sleep and most other bodily functions goes hand in hand with rest. But sometimes an opposite effect is noted: a flagging appetite, disorders of the stomach and bowels, sleeplessness and very marked nervousness, accompanied by hours of gloominess and despondency, develop. Manifestations of this nature sometimes overbalance the beneficial effect of continued absolute rest. Should these or similar symptoms occur, some slight liberties, such as sitting up or other small changes, may be cautiously allowed; or some harmless pastime (such as those suggested on p. 219) may be taken up, and the effect carefully watched. Bear in mind, however, especially if you have more than slight fever, that you will probably notice, and should be prepared for some disturbances of the nature just described, irrespective of the amount of rest taken. Even when such undesirable symptoms have occurred, it is seldom wise to materially modify the rest plan until

a trial of at least several weeks or months of rest in bed has failed to produce results. Moreover, even under unusual circumstances a relaxation of the routine is rarely advisable when the maximum temperature is above 99.5° F., or when signs of any nature indicate more than the slightest activity of the tuberculosis.

When a modification is decided upon, if the new privileges be taken up more with the idea of obtaining a harmless and pleasant change making for peace of mind and contentment, rather than for any direct benefit, one will sometimes be agreeably surprised to find that improvement follows. If the change produces no aggravation of the temperature or other symptoms, a little later the scheme of management may perhaps be further modified.

The question is frequently asked: Is it possible to secure too much rest? The saying, "If a little medicine is good, more is better," has often been proven false; and there is of course a limit to the value of all good things, including rest. Yet it is safe to say that if the matter be left to the decision of the sick person, in nine cases out of ten he will be inclined to take too little rather than too much rest. **Excessive rest does no great harm, while too much or too early exercise may produce serious results and even mean permanent defeat**; hence; when one is in a quandary, it is safer to err on the side of rest.

Exercise the Great Reconstructor

The Getting-up Period. As convalescence, marked by the fall of the fever and the disappearance of other symptoms, continues, sooner or later the getting-up period arrives. When this day comes—a day probably looked forward to with yearning and pleasure—make sure that you guard yourself carefully against allowing

the abounding feeling of joy to lead you to make too sudden or too wide a change in your habits. Make each little transition very, very gradually. At first, for example, you may merely sit up in bed for a short time—say for perhaps fifteen minutes—a period which may be lengthened from time to time if all goes well. (Sitting in bed is much easier if a back rest of some sort is used, and a number of manufacturers now supply ready-made back rests that are adjustable at various angles, which are very convenient.)

The next little undertaking is sitting in a chair. In the beginning this is to be continued for only a few minutes each day; an allowance which later may be extended to a half-hour, then to an hour or several hours, once or twice a day.

A further promotion is walking, consisting at first merely of a few cautious steps across the room; the walking thereafter being gradually increased, as the day-to-day condition permits.

The Importance of Exercise When Permissible. Under normal conditions, moderate exercise, by improving the circulation of the blood and increasing the supply of nourishment to each tissue and cell of the body, makes for a better functioning of each and every organ. *In health,* therefore, a certain amount of daily exercise is necessary if one is to enjoy life to its fullest degree.

Here is an incident that illustrates this point. Nowadays it is a common observation that moderate use of an automobile tire lengthens the life of the rubber. He who wishes, may verify this statement by experimenting with two tires. If one tire be laid aside and the other employed in travel a few miles daily, at the end of a year the tire that has been in service will probably be found capable of still giving considerably more mileage whereas the unused tire will be so stiff and lifeless tha



TAKING
A CONSTITUTIONAL

In good time exercise has just as important a role to play in recovery from tuberculosis as does rest. Exercise makes the cure enduring under more ordinary conditions of life and work. Walking is the safest form of exercise, but even walking is not to be indulged in in hit-or-miss fashion. The length of the walk is to be governed by the strength and needs of each individual, and once begun the walks should be taken systematically.



IN A
DANGER PERIOD

Altho this patient has been very ill she has made a remarkable improvement and — owing partly to overeating—has gained over forty pounds in weight. Partial healing has occurred, but healing has not kept pace with the outward improvement, so she must have patience and for a long time continue to take a large share of rest. In tuberculosis improvement in appearance often outstrips improvement in the lung condition, giving a false feeling of security which may easily lead to false steps. "Stuffing" tends to accentuate this danger.

after a short run it will show its worthlessness by chipping or falling to pieces. Similarly, moderate use of the healthy human body makes for longer life.

How Moderate Use of the Body Sometimes Promotes Recovery. Likewise, in certain cases of tuberculosis, a small amount of exercise taken daily has a tendency to directly promote healing in the lungs. Thus, occasionally, cases are encountered in which, despite faithful and prolonged adherence to the rest program, the disease continues to progress. In such a case, provided the disease is only slightly active, if one very cautiously begins to exercise just a very little bit each day, a turn for the better may occur.

The benefit which follows exercise in instances of this character has—to take up again the illustration set forth earlier in this chapter—its counterpart in the knitting of broken bones. For example, when a long period of immobilization of the limb has failed to produce results, the surgeon sometimes modifies the plan of absolute fixation and (guarding the injured member against undue movement by the application of suitable splints) allows the patient to use the limb a little. As a result of this change, owing to the improvement in the circulation which ensues as a result of the irritation produced by the mechanical rubbing together of the bone ends, healing may be stimulated just enough so that the break finally mends.

In like manner, the improved circulation of blood through the lungs brought about by moderate and rational exercise may now and then prove of benefit. This statement does not refer to the intentional exercise of the *lungs* by voluntary deepening of the breathing, but relates to the augmented circulation through these organs, in turn primarily due to the invigoration of the *entire* circulation as a result of a very limited and

guarded use of the *whole* body, but which is also in part attributable to the involuntary deepening of the breathing which necessarily accompanies general exercise.

On Building Up the Body. At the end of the rest "cure," the convalescing patient usually finds himself rather soft and flabby. If he is to do more than just passively exist or be merely a fairly healthy loafer, if he is to fill a real place in the world, he must be hardened and toughened and put into shape to withstand the wear and tear of everyday life. At this time, then, if there be no valid objection to its use, exercise fills an essential need. Hence, if all goes well during the getting-up period, the liberties should be progressively increased as circumstances warrant. **This period of seasoning is often neglected by those who are convalescing, to their ultimate regret.**

The directors of most sanatoria consider this one of the most important features of the treatment. But unfortunately, for one reason or another, in many instances patients leave the institutions and revert to their former habits or perhaps take up work again before they have been hardened and fitted for the grind of ordinary affairs. Accepting at its face value the circumstantial evidence that they look and feel well; failing to see, or to believe, that their lusty appearance and feeling of strength is mainly due to their idleness—quite unmindful of the fact that they have not yet been tested; not realizing that what they have acquired is so far largely a shell of health—overlooking these things and perhaps thinking that they "will take it easy for a while" (a thought that usually proves a delusion and a snare), prematurely and rather suddenly they slacken their efforts, or perhaps break off the rest treatment entirely, and jump back into harness.

What is the result? **Too often there follows a re-**

lapse, which with reasonable certainty could have been averted had more time been given to the treatment at this, the great danger period.

One should memorize well the fact that the object of treatment is not only to cure the disease but, in so far as possible, to nullify its results. Judicious and systematic retraining of the muscles and organs for their various duties is highly necessary, if one is to build a sound foundation for permanent health. The disease has been known to heal, yet death occur. This paradox of "death from improvements" is usually caused by the failure of one of the vital organs, damaged by the chronic poisoning and strain it has undergone during the siege of sickness. **Proper conditioning of the individual, by carefully graded exercise at the right time, will prevent many of these deplorable occurrences, and thus save many a heartache.**

What Forms of Exercise Are Advisable?

Walking is the form of exercise suitable for most patients. After the getting-up period has passed, and the patient has become accustomed to moving about the room or house, he may begin to step outside a little. If all works smoothly, from then on the daily walk should be gradually lengthened. In the average case, after a few days, an increase of perhaps one or two hundred feet daily or every few days may be made, the exact amount of the increase being governed by the effect. Still later, if the case is fitting, the walk may be progressively increased to a half-mile, to a mile, and so on; until, as the walks are extended more and more, the individual is gradually enabled to walk three to five miles or more each day without ill effect, or to spend several hours at a time on his feet.*

* For those whose work is largely mental, who have been accustomed to take but little exercise and who know that they

Later, other forms of moderate exercise, such as chair seating, pottery making, the carrying of light loads (no heavy lifting), vine trimming, light gardening (no hoeing), lawn raking (no mowing*), or other kinds of light work, may serve both as time consumers and to fit one to again earn his livelihood.

Other suggestions along this line, with detailed instructions for carrying out the various crafts described, may be found in a very handy and useful manual entitled "Handicrafts for the Handicapped," by Hall and Buck, carried in stock by the Journal of Outdoor Life, 370 Seventh Avenue, New York.

General Instructions for Exercise

At the outset, it is well to take the walks or other exercise at the time when the temperature is lowest, which is usually in the morning. Later, an evening period for exercise may be added.

IMPORTANT GUIDES

Walk slowly and rest frequently. Do not run or make any violent exertion. For a long time, make it a point to walk only on the level. If the walk must be made on a grade, it should be so arranged that return is made down-hill. Mountain climbing should be considered strictly prohibited, unless on the direct advice of the physician in charge. Stair climbing should be

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will be forced to fall back suddenly into sedentary habits, the accustoming to long walks is less important than for those who do manual work. However, whether or not long walks are taken, a long period of seasoning in which some exercise is taken is important in any case.

* Owing to the fact that these lessons are written for patients in all stages of the disease, each with his own peculiar problems, it is impossible to avoid being somewhat dogmatic in formulating rules. For example, here and there an exceptional patient may be able to do a little lawn-mowing without ill effect, but for the majority, the act is too strenuous. A little leeway may therefore occasionally be allowed in interpreting these rules or items in the individual case, but under no circumstance should the variance be great.

avoided. Never start to go a set distance, and bear in mind that you must return. Do not allow yourself to become tired or materially short of breath, or exercise sufficiently to produce cough. At all times guard yourself, remembering the saying: "The healthy man sits when he is tired, but the consumptive must sit that he should not become tired."

Regularity. *Exercise, once begun, should be taken regularly, unless for good reason.* How often it is that persons with brightest outlook permit whims, mere inconvenience, personal distaste, laziness, or other small factors to interfere with the business in hand. Through half-hearted dilly-dallying and spasmodic effort—overdoing one day, doing too little the next—they lose what little they have gained, and are finally passed and outdistanced by others who, with only a small chance at the beginning, yet have made good through consistency and perseverance.

It is seldom the case that a gentle shower or slight fog, or moderate cold, alone, should be allowed to veto the daily walk. Extreme inclemency of the weather, such as is due to violent wind or bitter cold, is sometimes an exception. (Of course, sufficiently warm clothing should be worn, and other appropriate articles for protecting one against the elements, such as mentioned in Lesson XI, pp. 279 and 280, made use of.)

If, however, for any reason the daily exercise is curtailed or omitted, when begun again, drop back correspondingly in the length of the walks and again gradually increase them, as before. Make each increase very gradually and aim to desist *short* of any noteworthy feeling of tiredness. Note that the injurious effect of overexercise is often not manifested at once, and that in some instances it never becomes directly evident, but is shown merely by a failure

to convalesce as rapidly as would otherwise occur.

Quite frequently excessive exercise produces an elevation of the bodily temperature, but the rise does not necessarily take place on the same day. In other cases overexercise produces a drop in temperature, due probably to the exhaustion of energy.

No Exercise When the Sputum Contains Blood. Unless contrary advice is given by the physician in charge, the rule should be scrupulously maintained not to exercise when there is even the slightest trace of color in the sputum.

For other guides to exercise, the reader should turn back to the topic "Rest" in the first part of this chapter. This section should be read carefully before taking up exercise in any form, bearing in mind that when rest is indicated, exercise is prohibited, and vice versa.

Advisability of Noting the Results and Regulating the Amount Accordingly. The effect of exercise should be watched, and if untoward symptoms occur, no further increase should be made for a time; or if necessary the walks should be cut down temporarily, or even foregone entirely for a while. In some cases a loss of weight occurs. If this loss is but slight, and other symptoms are not noted, no concern need be felt. If one has been previously overeating or has put on a large amount of weight, a slight loss is almost to be expected. But if much weight is lost, or even a small loss is progressive, curtailment or even absolute interdiction of exercise may be in order.

Commonly a mild shortness of breath and general feebleness accompany the first attempts at exercise. As a rule, these symptoms gradually wear off with practice. So, altho they are to be looked upon as an additional warning to go slowly, such symptoms are not alone to be considered as a bar to a small amount of exercise when

otherwise indicated, unless they are pronounced or very persistent. A moderate increase in the pulse rate during, or shortly following, exercise is also to be expected, but the pulse should fall to its previous rate within twenty minutes or half an hour.

PRECAUTIONS FOR CERTAIN PATIENTS

Those patients suffering from advanced disease, especially elderly persons, should use extraordinary discretion in extending the walks. For some in this class, even tho the lung condition has improved remarkably, or has even healed entirely, long walks, or their equivalent in other forms of exercise, never become advisable. If the destruction of the lung has become extensive or the other organs seriously crippled, Nature may be unable to entirely pay back the loss, at least for a long time, perhaps never.

When living a life of moderation, such persons seem as well as their more vigorous friends, and may attempt to follow the example of the latter. They should remember, however, that they have no reserve, and that no matter how rugged their outward appearance, nor how strong they feel when at rest or doing little, they must not permit themselves to be deceived. Those so afflicted may enjoy a life of moderate activity, but must content themselves to always keep well within the limits of their own life resources.

Afternoon Rest Hour Should Be Observed Faithfully for a Long Time. Even after one is up and about the greater portion of the time, the afternoon rest hour should be faithfully observed for at least a number of months, and in some cases for years. To many this will prove a life-saving boon.

The "Work Cure" and Vocational Training

Persons who hear of the "work cure" for tuberculosis are sometimes skeptical as to the real value of rest. Let it be understood, therefore, that **the work cure, as carried out under the directions of physicians who are actually getting results, is based on the same general principles as the treatment described in this lesson. The name is misleading.**

The sponsors of the "work" plan believe thoroughly in rest when the disease is materially active, but insist, in selected cases only, on the great value of carefully graded exercise—which may take the form of mild, carefully systematized work in certain instances. Some of the advocates of the so-called "work cure" favor instituting exercise a little earlier than is ordinarily practised, but in no instance is it begun before the disease is at least quiescent. One should not fail to note the fact that **any attempt to carry on one's regular occupation is liable to end in failure.** (Those who **must** work at the same time that they are putting up a fight for their lives should on the other hand by no means give up hope, but should remember that faithful adherence to the other rules for recovery may make up for the failure to abide strictly by this one. However, unless forced to earn one's way, it would be utter folly to continue at regular employment while "taking the cure.")

Nevertheless it has been thoroughly proven that in certain cases the return of health is materially hastened if the patient is permitted to take up some light and strictly limited avocation or vocation during the building-up period. For a number of years it has been the policy in many sanatoria in carefully chosen cases as soon as the condition of the patient permits to give him some agreeable, easy work to perform each day. This

work, either mental or physical or both, is carried on regularly under the close supervision of the physician.

In this way the interest of the patient is often sustained at a time when because he feels so energetic he is apt to grow careless and perhaps spoil his chances entirely by radically breaking away from the health program. Then, too, it is very encouraging to find oneself again accomplishing something useful. So the combined result of these and other influences is an actual boost toward recovery.

More recently special vocational training along definite lines has been introduced in a number of sanatoria during the final phase of the patients' sojourn. Such training is not of course adapted to all cases, but is particularly useful for those who have previously led very active lives and who find difficulty in holding themselves under control unless their time is at least fairly well occupied. For this reason vocational training finds perhaps its greatest sphere of usefulness in the treatment of tuberculous soldiers and sailors. In any case, the work is undertaken only during the building-up period and is even then taken up very gradually, at first for only an hour or two a day. There is no question that in certain cases the right sort of systematized training has helped greatly toward fitting the patients for a useful place in the world's affairs, but it should be understood that the success of the program is in direct proportion to the care used in supervising the patients, coupled with the fact that the training is along interesting and suitable lines of endeavor, which necessarily differ in each case.

The Question of Gymnastic and Deep Breathing Exercises

The exact place of exercise of the lung—deep breathing—in treatment, is as yet unsettled. That many who lend encouragement to the plan of deep breathing have not a clear understanding of tuberculosis is decidedly unfortunate. Ofttimes basing their arguments on the fallacious belief that lack of oxygen is the essential cause of tuberculosis, they claim that the inhaling of more oxygen through deep breathing will be an important help toward cure. Strange as it may seem, this old idea has long ago been largely exploded,* **but the discovery that this is true in no way lessens the value of fresh air.** (See passage under the heading "The Effect of Fresh Air" in Lesson XI.)

The question of deep breathing during health is entirely different, but there is no doubt about the fact that exercise of the *tuberculous* lung at the wrong time, by injuring the delicate healing tissue and by spreading the disease, has done much harm. Whether or not lung exercise is useful as the disease becomes arrested is to be determined by the expert physician, who will decide each case upon its individual merits. One difficulty is, that once having commenced deep breathing, many, perhaps most patients, will fail to adhere systematically and consistently to the daily schedule of deep breathing unless the breathing exercises are carried out under an instructor in unison with other persons. As irregularity itself works harm, this furnishes further evidence against the advisability of exercise of the lung in the ordinary or average case. In selected cases, on the other

* In truth, the facts warrant the statement that ordinary pure air, taken into the body in ordinary amount (or in such quantity as is regulated automatically by the involuntary deepening of the breathing in accordance with the immediate requirements), supplies the body with all the oxygen it can utilize, even in tuberculosis, save under exceptional circumstances.

hand, as or after the disease is arrested, judiciously carried out, certain lung exercises are worthy of trial.

General Gymnastics. Similarly, mild calisthenic exercises, altho unquestionably worth a great deal in suitable cases (chiefly early cases, and not by any means all early cases) in seasoning the patient after the disease is fairly well arrested, may cause irreparable damage if applied in a hit-or-miss fashion. Some physical directors who do not have a proper knowledge of tuberculosis do harm by advising physical exercises for persons who, altho apparently well, are suffering from unrecognized tuberculosis.

Under no circumstances should either deep breathing or gymnastic exercises be taken up, except on the advice of a competent physician conversant with the peculiarities of the given case. First and last, let it be remembered that health and endurance are wanted, rather than great strength. The price demanded for large muscles and the figure of an athlete may be far too heavy to pay.

Amusements and Pastimes

As soon as the condition of the invalid permits, the taking up of some suitable diversion will prevent time from becoming a drag, will help to keep gloom and worry at a distance, and indirectly hasten recovery. The one essential is, that the pastime itself be incapable of working harm.

The invalid who is not extremely ill may be read to in moderation; a little later he may himself read a little. It is important that the bed be so placed that a good light falls on the book, and that the bright sky is not faced. This simple precaution, if heeded, will obviate much headache and discomfort. So too, crocheting, knitting, or a little later, when one is able to sit in

a chair, basket weaving, carving, art metal work—each has its place. For many women knitting especially seems to furnish the charm that brings a mental ease and repose which can be secured in no other manner. Again, some of the milder table or bed games, such as solitaire, checkers or dominoes, may be made to serve a similar purpose. On the other hand, card playing is not usually permissible, because of its tendency to provoke excitement, while chess requires too great an expenditure of energy. Later, when exercise is permissible, painting, photography, music (light playing only), nature study, a love for birds (which may be studied through opera or field glasses) and flowers, or some cultivated hobby, will serve the same end.

Games, such as pool or billiards, bowling with a light ball (exceptionally), croquet; short auto rides,* provided the invalid does not drive the car; motor boating (no rowing) on a small, calm body of water; boat fishing (trout fishing in streams is too strenuous); target practice with a light rifle (or even the hunting of small

* When the patient becomes able to get up and about a little, occasional or even fairly frequent motor rides (unless riding in an auto makes the patient very excited or nervous—some nervousness being almost natural at first) will prove not only enjoyable, but probably beneficial as well. The continually changing scenes inspire an altogether new sequence of thoughts which keep the patient from growing introspective, which, together with the bracing effect of the moving air, make for more restful sleep, a greater zest for food and a general invigoration. Those who are thoroughly impressed as to the value of rest, often fear that motoring entirely violates the rule of rest, and defer getting out in the auto longer than necessary. It goes without saying, that only very short rides should be taken at first, and the speed should be slow, but no anxiety should be felt because of the moderate jolting that may ensue. Some are afraid that a hemorrhage will be brought on, or other complication occur. As a matter of fact, altho the bouncing about and jolting of the body is likely to make the muscles and other parts of the body somewhat sore or to bring on an ache or pain here or there (a common effect no matter how long the first ride is postponed), there is less chance of harm from this largely *external* shaking than there is from forcible coughing, loud talking, boisterous laughing, singing, or other acts that provoke *deep breathing* and produce a direct irritation in the disease area. In some cases, wherein it seems essential to modify the rest program a little sooner than customary, the good derived from fairly early auto rides (or short trips in a buggy) may more than compensate for the slight infraction of the rule of rest.

game, if the hunter is content to confine "the chase" to a leisurely stroll on level land)—are all useful in moderation. In milder cases, near the end of the building-up period, horse-back riding, and auto-driving if the car be light and easily handled (no cranking) are sometimes allowable. Golf (with the full swing), tennis, baseball, football, handball, basketball, bicycling, polo, boxing, dancing, surf-bathing, swimming and other pastimes that require violent exertion are to be resolutely tabooed.

At first only a short time should be given to these amusements, and one should never persist long enough to cause fatigue or nervousness, to produce a rise in the bodily temperature, or to bring on other detrimental effects. Remember that **the glow of excitement and pleasure may entirely mask one's real feelings for the time; not till later does a reaction show that one has done too much. Make it a point, therefore, to take up nothing that cannot be laid aside at any time, and to stop short of all tired feelings. Tasks of all kinds should be strictly forbidden.**

LESSON X

THE SECRET OF EATING TO WIN

THE ultimate attainment of victory over tuberculosis depends to a large extent on the maintenance of at least fair digestion to the end of the battle; hence it is imperative that every precaution for the protection of the delicate digestive organs be taken. Inasmuch as hit-or-miss methods in eating have often led to failure, it is obvious that those who are bending all efforts toward recovery will do well to give careful study to the matter of dietary. Altho it is not possible to describe in detail a dietary suitable for everyone, rules of a general nature can be given, which will serve as a guide in selecting foods for the individual case. In making the selection, two fundamental principles should constantly be kept in mind. The first is: *Eat the least amount that will produce satisfactory results.* This precept will be most easily followed by endeavoring always to live up to the second rule, which is: *Eat foods that count.* Other guides will be mentioned later, but it will be well now to examine these basic laws more closely in order to ascertain their exact meaning.

1. Eat the Least Amount That Will Produce Satisfactory Results. This statement at once brings to mind the question: *Does a satisfactory result mean a gain in weight?* The answer is that improvement is usually, tho not always, accompanied by a gain in weight; but this is not the primary object for which one should strive. If much flesh has been lost, this will probably be gradually restored as healing in the lungs

occurs; further, if a state of buoyant health is regained, such as one has not enjoyed for years previously, the weight may even climb above its previous average and remain at this higher point. An increase in weight, if not extreme and made on moderate rations, is of value. On the other hand, it should be distinctly understood that a gain in weight alone is worth little; and flesh taken on rapidly as a result of overeating may be worth less than nothing.

The chief aim of treatment is to secure healing of the disease, and, practically speaking, only so far as weight acquired means a gain in energy and *lung-repair,* is it of value. In some cases the process of repair requires so much energy that, altho an ample amount of food be eaten and digested, weight may not be put on, or may even be lost, notwithstanding the lungs are healing. Some persons who recover completely never become as heavy as they formerly were. On the one hand, if one who has lost flesh can gain moderately in sound flesh without at the same time doing oneself harm in other ways, the vital power for overcoming the malady is usually correspondingly increased; moreover, a reserve is being developed, upon which one may fall back in case of future breakdown or complication. The gradual building-up of sound flesh, *if associated with other evidences of improvement,* may therefore be accepted as a fairly reliable index that the lung condition is progressing satisfactorily. On the other hand, if other signs indicate that one is doing well, no concern need be felt over the failure to gain weight, or even the loss of a little. Broadly speaking, a comparatively steady gain of a pound or two a week, or less, is worth more than a very rapid gain.

In considering the injunction that the least amount of food necessary should be eaten, it should be under-

stood that this does not mean, except in extraordinary cases, that one should eat less food than has been one's custom when well. On the contrary, the dietary of the sufferer from tuberculosis should usually be somewhat larger than in health. This means that if, yielding to a failing appetite, you have fallen into the habit of eating exceedingly little, you must now consume a considerably larger ration. Remember that you have not only to meet the ordinary requirements of life, but that your body continually requires extra energy with which to fight the disease, so that your present needs are actually greater than before you became ill.

You should endeavor to meet this increased demand mainly by **eating the proper kinds of food, by adhering rigidly to the other rules for eating and living, and by conserving the energy through rest. If, in addition, you eat three rather generous meals daily, this will probably be adequate. In this case, eating between meals is not only uncalled for, but may do harm.**

2. Eat Foods That Count. How many persons there are, who eat a sufficient quantity of food, yet fail to gain. The root of the trouble in many of these cases is that the digestive organs are taxed needlessly with edibles that contribute little to the fighting efficiency. The solution of the problem is the eating of foods that furnish energy and strength and build sound flesh, rather than those that serve merely to cater to the appetite or those that make soft fat. Just as the victim of tuberculosis is often a nervous individual with a changeable, capricious disposition, so his stomach * is apt to be extraordinarily sensitive and irritable; his fickle appetite calling for many favors, which should not be granted. For these reasons, rich food, nicknacks and

* Here, and in certain other places in this book, the word *stomach* is used in a figurative sense, to avoid the frequent repetition of the more cumbersome term, digestive organs.

highly seasoned eatables, whose tendency is to cause the digestive organs to rebel, are to be avoided as a rule. Altho plain food is not so toothsome, it is ofttimes a preventive of serious trouble. (Later in this lesson there will be given a list and description of the more important foods that count.)

In addition to the two basic rules just discussed, other important guides for eating include:

3. Always Respect the Feelings of Your Own Stomach. Bearing in mind that the digestive organs of no two individuals are exactly alike, let each person eat nothing that past experience has shown to be harmful to him, unless the evil effect be small and the need for the particular food great. In observing this rule, it is important to first make sure that one is not being governed by a whim or a mere dislike for a certain food. Again, a really valuable and highly important part of the dietary should not be put aside solely for the reason that it produces some slight distress of a temporary nature—a distress that is disagreeable rather than actually harmful.

4. Eat Regularly and Eat Slowly. Many a person who, owing to a delicate stomach, has seen his chances fading, has forced the tide to turn in his favor and has finally won, by adhering firmly to this rule. Altho the first stomach was in use as early as the stone age, this organ has from the first adopted modern methods and has always demanded regular hours of labor. Through many generations the *American* stomach has held to its custom of working three times daily for a limited period. Unless false habits have been formed it is resting at other times, and is then not easily awakened to vigorous action. It is evident, then, that the average person should have his three "square meals" a day, at *set* intervals, which should be religiously adhered to.

The stomach demands further that the crude food material be previously properly prepared and supplied in such form that it can be digested in a reasonable time. This means that the food should not be bolted. Thorough mastication is an important preliminary to digestion. Plenty of time should be given to the meal, and the power supply of the digestive organs not diverted by distractive influences. To this end, reading or exciting conversations while eating should be avoided. In many instances, it is better for the ill person to eat alone at first. In other cases, it may be found that the invalid is more inclined to gulp down his food when alone than if he has company at the table. When this is true, the presence of other persons may be beneficial; this is the more likely if he shows a tendency to brood over his troubles at meal-time—a state of mind which often retards the flow of digestive juices.

5. The Dietary Should Contain All the Food Elements in Suitable Proportion. In order to work most efficiently the body requires nutrient materials of all classes (which will be mentioned below), combined in fairly definite ratio. See to it, therefore, that your daily ration is properly balanced, and not a one-sided giving way to personal taste.

6. Complicated Food Combinations Should Be Avoided. Altho food elements of all varieties are needed, this does not mean that the menu should consist of a combination of a large number of widely dissimilar items. It requires only the application of the law of common sense to see how unreasonable it is to expect the digestive organs to do good work when many different duties are imposed upon them at one time. It is important, therefore, to make your menus as simple as possible.

The Three Food Groups

For practical purposes, foods may be divided into three groups, as follows:—

1. Repair and Body Building Foods. These foods serve to enrich the blood, to build new tissue, and to make up for the daily wear and tear on the bodily machinery.

2. Fuel Foods. (Sometimes called *quick* fuel foods.) Foods of this class supply heat and power to the bodily engine.

3. Reserve Foods. (Sometimes called *slow* fuel foods.) Reserve foods are stored in the body against future emergencies, when they are called upon to furnish heat and energy as required.

The Food Ratio

The average *well* person will have the best chance of retaining his health if his meals are arranged so that roughly from one-tenth to one-fifth of his daily ration consists of body building foods, the menu being completed by the addition of members of the two other principal food groups, preferably combined in such a manner that the *fuel* group is represented in approximately twice the amount of the *reserve* elements. On the other hand, as already intimated, the dictates of reason would lead one to presume that the *sick* person has need of additional food to repair the damage done by disease; as a matter of fact, experience has demonstrated that the sufferer from tuberculosis often can increase, with benefit, his allowance of both the body building and the reserve foods from 25 to 50 per cent above the quantity required in health.

If each individual will fix in mind the relative amount of each food group that is required, and select from each

group such foods as agree with him, he will find that the knack of eating to win is easily acquired.

BODY BUILDING MATERIALS PROTEINS	QUICK FUEL MATERIALS STARCHES AND SUGARS	RESERVE FUEL MATERIALS FATS AND OILS
The important sources of proteins are:	The important sources of starches and sugars are:	The important sources of fats and oils are:
Lean meat	Cereals	Meat (fatty part)
Fish	Wheat	Bacon
Milk	Corn	Butter
Milk products:	Oats	Oleomargarine
Cheese	Rice	Cream
Custard	Barley	Eggs (yolks)
Eggs (whites)	Rye	Olive oil
The legumes	Cereal products:	Cottonseed oil (salad oil)
Beans	Bread	Nuts (especially peanuts)
Peas	Breakfast food	Cocoanut oil
Lentils	Macaroni	Sesame oil
Nuts	Spaghetti	Corn oil
Cereals (10%)	Noodles	Peanut butter
	Dumplings	Soy beans
	Potatoes (Irish)	
	Potatoes (Sweet)	
	Corn	

IN ADDITION, THE FOLLOWING ARE FAIRLY GOOD FUELS:

Parsnips	Carrots
Artichokes	Onions
Turnips	Spinach and other greens
Beets	Squash
Sugar (hard to digest if eaten in large quantity)	Apples
Honey	Figs
Dates	Cherries
Prunes	Pears
Raisins and grapes	Oranges
Bananas (somewhat constipating)	Grape-fruit

EDIBLES WORTH LITTLE AS TRUE FOODS

But which have value from other standpoints (See text, pp. 236 and 237).

Vegetables	Fruits
Celery	Peaches
Lettuce	Apricots
Cucumbers	Lemons
Asparagus	
Eggplant	Especial Trouble Makers
Radishes	
Cauliflower	Canteloup
Cabbage	Watermelon
Brussels-sprouts	Cucumbers
Tomatoes	Cabbage
Rhubarb	

LIFE REGULATING MATERIALS

Vitamines

The important sources of vitamines are:

Milk, Cream	The legumes
Butter (not oleomargarine, except insofar as it contains butter)	Vegetables (especially potatoes and the "greens")
Cereals (coverings and embryo)	Fresh fruits
Egg yolk	

(Note: The vitamines are injured by cooking.)

The Life Regulators and Minerals

In addition to their value as real foods—that is, as sources of tissue or energy—many of the things we eat contain a peculiar essence which, tho infinitesimal in amount, is nevertheless necessary to keep the stream of life flowing in orderly manner; to regulate the growth of the body, and to prevent the development of scurvy, rickets and similar diseases. However, if a well mixed diet is eaten, one can hardly avoid incorporating in the daily ration some of these health-promoting principles or life-regulators, termed *vitamines;* so ordinarily little attention need be paid to them. Certain minerals are also very essential to the making of bone and blood,

but as these, too, are obtained in many different foods, they need be given only a passing mention here.

For infants and children, however, whose menu is less varied, attention to the mineral and vitamine content of the daily ration is highly important. This point—the question of providing the infant and child with sufficient vitamines—has been touched upon in Lesson III, p. 60, and the more noteworthy vitamine-containing foods will be named in describing the—

Pros and Cons of Some Everyday Foods

BUILDING AND REPAIR FOODS

MEATS. Because meat holds so frequent a place on the bill-of-fare of the American people, this article of diet will be considered first. Let it be understood, however, that this does not signify either that meat does, or does not, occupy first place in importance. The question whether or not meat is necessary to health, and the question of its relative value in comparison with other foods of this group, will be discussed a little later. Suffice it to say here that lean meat is *one* of the important body-building foods.

Lamb and mutton are especially valuable, but beef, too, ranks high. On the whole, broiled steaks, rare tho tender roasts, and scraped raw meat sandwiches, yield perhaps the maximum value. Pork is digested with more difficulty than mutton or beef, and, with the exception of bacon, is the least satisfactory of the meats for frequent use. Fish and poultry are useful in varying the bill-of-fare, but are actually worth slightly less to the body than other meats. Turkey, chicken and rabbit are better foods than duck and goose.

Those families to whom expense is an important consideration, should remember that veal—even "bob" veal,

formerly looked upon with great disfavor, is now known to be at least a fairly satisfactory food.* It may be well, also, to emphasize the fact that the tougher, cheaper cuts of meat, if well cooked, are practically as easily digested and as nourishing as the choicer, more expensive parts.

EGGS. Eggs are valuable tissue-builders and also furnish in their yolks a considerable amount of iron for enriching the blood. Eggs and milk hold a unique place among animal foods in that they are the only products of the animal kingdom that contain a certain amount of each of the basic food principles.

Eggs may be taken in any form, altho it is well to avoid eating fried eggs frequently. Raw eggs, altho formerly much praised, are in fact in the average case probably less easily digested than if cooked; furthermore, raw eggs sometimes upset the stomach, or produce diarrhea or other disturbance of the bowel, etc. Exceptionally, however, they may be handled better than eggs in other form, and therefore be especially valuable. Then, too, there are cases in which, for reasons that are still somewhat obscure, a combination of raw egg, beaten with milk, is better taken care of than either milk or egg alone. Again, because of the ease with which they are swallowed, as a matter of convenience raw eggs occasionally become an important part of the dietary, in those less common cases in which forced feeding is desirable. It is remarkable with what agility the supposedly nauseous raw egg may be swallowed. If a small quantity of lemon juice be squeezed into a cup, the egg with the unbroken yolk dropped in, and a little more lemon juice added, the egg may be tossed down whole with no taste except of the lemon—and the trick is ended almost before one knows it.

When cost is a large factor, eggs preserved in water

* So too, it may be worth mentioning that horse meat is an excellent food, and in time of meat scarcity may be used in place of beef with perfect impunity.

glass, or cold storage eggs (if the time limit of the law be not exceeded), may be eaten with safety.

MILK. Milk is one of the best of all foods, both because it contains a moderate amount of all the primary food elements (and vitamines) and because it is usually digested with ease and readily assimilated. Then, too, milk and eggs both contain a considerable quantity of valuable mineral matter, the percentage of lime being especially large. Lime, it is recalled, is very necessary in Nature's process of repair (described in Lesson VIII), and for this reason also, these two articles have a particular value in tuberculosis. Unless there be an excellent reason why it should not be taken, in reasonable amount milk should be given a place on the food program of all patients. Ordinarily, one or two glasses taken with each meal are sufficient.

If one has a dislike for milk, its taste may perhaps be made agreeable by the addition of Vichy water or coffee, or by dropping in a pinch of salt or baking soda. If there is difficulty in its digestion, the milk may be diluted one-half with water or modified by adding a teaspoonful or more of lime water to each glass. Again, it may be mixed with malted milk, or with one of the prepared invalid foods, such as Dennos', Eskay's, Nestle's or Mellin's foods. Sometimes the stomach will tolerate hot milk when it rebels against cold milk. However, milk should not be heated except for a good reason; for while hot milk is more readily digested than raw milk, it has the drawback of being more constipating.*

In other cases, if one has an aversion to sweet milk, or if it causes distress, koumiss or one of the artificially soured milks—resembling buttermilk (which are less constipating than sweet milk)—may prove agreeable.

* Moreover, heat injures or destroys the vitamines in the milk. This factor, however, has less bearing in the case of the adult, whose more varied bill-of-fare provides other vitamine-containing foods, than during infancy and childhood, when milk is the *mainstay* of the dietary.

The prepared sour milk should be made each day from fresh sweet milk by adding first a little water and then a culture of the true lactic acid bacillus (the Bulgarian bacillus), allowing the mixture to stand a number of hours according to the directions on the package. Various preparations of the Bulgarian bacillus are on the market, some in dried or tablet form, others liquid. The liquid cultures are the more reliable, altho the dried products are fairly satisfactory and more convenient. Milk modified in this manner is very palatable and is better than genuine buttermilk, not only because the latter contains virtually no butterfat, but because true buttermilk often does not contain the genuine Bulgarian bacillus, and also is liable to be contaminated by harmful germs.

In still other instances, the difficulty may be gotten around by partially predigesting the milk. All that is necessary for preparing the milk in this manner is to buy some "peptonizing" powder of the druggist, and follow the directions enclosed.

Goats' milk agrees with certain stomachs that will not tolerate cows' milk. Goats' milk is unusually rich, and has the additional advantage that it seldom serves as a medium for spreading the germs of tuberculosis, as goats rarely contract this disease.

Worth Remembering. In regard to the taking of milk, one final point deserves careful attention. The multiplied lessons of experience have shown that when milk disagrees, it often does so chiefly because it is hastily swallowed, and perhaps gulped down, a glassful at a time. Whether or not it is an advantage for *all* persons to drink milk very slowly, is, strange to relate, unsettled. But when the stomach has once manifested a violent antipathy to this valuable food, matters can usually be materially improved if one will **cultivate**

the habit of taking the milk in small sips from time to time, taking, say, a half hour to consume a glassful. Before concluding that it is necessary to eliminate milk from the bill-of-fare, this plan should be given a thorough trial.

Milk products, such as custard, junket, cottage cheese and other cheeses, are all highly nutritious, and may be used to relieve the monotony of the menu.

Ice Cream and Ices. Patients often inquire whether or not ice cream is a good food. In the first place, ice cream is to be looked upon as a rather concentrated form of cream and egg (or cream, milk and egg). In other words, in eating ice cream one is really getting a large amount of nutriment; but is at the same time running some danger of upsetting the stomach through putting into it so concentrated or rich a food. In addition, the very *coldness* of the dish tends to delay digestion and invite trouble. All in all, however, the power of ice cream to work injury is quite generally exaggerated. As a matter of fact, in the average case, if not over-indulged in, ice cream is frequently useful to round out and break the sameness of the menu; at the same time it adds materially to the food value of the meal. Sherbets, ices and similar preparations, contain more water and less nutriment, and are accordingly of less value.

THE LEGUMES. Peas, lentils, and beans of all varieties, stand high as building foods and are useful as meat substitutes if not used too frequently. It is unfortunate that these foods, especially beans, have the disadvantage of resulting in much gas-formation, this being very troublesome to some persons. This distressing feature can, however, be obviated in part by adding a small amount of baking soda to the water in which the beans are first boiled, later pouring the liquid off and continuing the cooking process in fresh water.

Those who are troubled with gas-formation or who find themselves sleepless and tossing about at night after having eaten beans at the mid-day or evening meal, should bear in mind that **the best time to serve beans is at breakfast.**

In regard to string beans, it should be mentioned that the hull is largely waste material; it is the bean itself that is the really valuable part.

NUTS. The various nuts are also important meat-sparers, but, as a rule, should be eaten only in limited quantity, as the digestive organs of most persons handle them well only in moderation. Nuts will probably be cared for to the best advantage if made one of the items of the lightest meal of the day—a meal from which meats should preferably be excluded or eaten only in small amount.

THE CEREALS. The cereals also yield a small or moderate, tho definite, quantity of protein, and for this reason are to be included among the body-builders, altho they hold an even larger place in the fuel food group.

FUEL FOODS

CEREALS. That the term "Staff of Life," as applied to bread, is appropriate, has been amply proven by time and experience. If *bread* is made to read *cereals*, the name is even more suitable. As a class, the cereals are the body's most valuable source of fuel, wheat and corn holding highest rank. The cereals are richer in starch than any other foods—about 75 per cent—and it is to this large starch content that they owe their worth as fuels. They may be served in flour products, as breakfast foods, or in the shape of macaroni, spaghetti, or noodles, or in some other manner, but in whatever

form taken, the cereals should make up a large part of the dietary.*

VEGETABLES. Considered as a whole, the vegetables constitute the second great source of fuel. Potatoes, both white and sweet, stand highest on the list. If corn be placed in the vegetable group, it too should be given a prominent position.

Other vegetables of less, tho moderate, value include: parsnips, artichokes, turnips, beets, carrots, onions, spinach and other greens, and squash.

A third class of vegetable supplies considerable bulk and filling, but only a relatively small amount of actual nutriment. Embraced in this group are: tomatoes, celery, lettuce, cucumbers, cabbage, Brussels-sprouts, cauliflower, asparagus and rhubarb. The incorporation of a reasonable quantity of these vegetables in the daily ration is usually desirable, to supply their quota of minerals and vitamines, to give residue to the bowel contents, or to add piquancy to the meal, yet the fact should be kept before one that in eating these things one is getting little food value.

One member of this group of vegetables, cabbage (when cooked) is digested with difficulty by many persons, and results in the formation of much gas. Ordinarily, it should be eaten infrequently, or banned from the table. If admitted to the menu, cabbage will be less apt to cause distress if boiled only a short time (say, twenty

* In addition to supplying a large amount of energy to the body, the cereals are useful in another way. When one eats the various grains, the undigested residue of their outer coverings lags behind in the bowel, this "roughage" serving to give bulk to the fecal mass, to retain moisture, and to spur the intestines on to better work, thus facilitating regular evacuations. For those who suffer from a delicate stomach, however, this ordinarily good quality becomes a detriment—the coarser grain coverings serving to irritate the stomach lining, and to aggravate the trouble. In this event, it is usually best to eat only those cereals from which the outer hull has been removed. When the stomach and bowels both refuse to do their duties, the lesser of the two evils should be chosen; this means as a rule that the stomach and upper intestine should be supplied with the mild, easily digested foods that they demand, and other means employed to conquer the constipation.

to thirty minutes). Raw cabbage, as in the form of slaw, ordinarily produces no ill effects.

Thus an important point, applying to all foodstuffs, is brought out: **Faulty preparation of the food is often the cause of trouble, rather than the article itself.**

Caution. Do not indulge in too many kinds of starches at one meal. True, many of us may thus transgress daily for years and years without harm resulting, but it may usefully be remembered that when starchy foods disagree the dietary obstacle can often be gotten around by taking this simple precaution. For example, if potatoes and a cereal in some form, such as macaroni, are served, it may be best to leave out bread.

SWEETS AND FRUITS. Sugar yields a large amount of energy; in fact, sugar is turned into energy and strength with extraordinary rapidity. Nevertheless, sugar is well tolerated only in limited quantity, especially if taken in concentrated form. For this and other reasons it is well that it be taken mainly in its natural form, as occurring in honey * and fruit.

Tho useful as laxatives and for their mineral and vitamine-content, if eaten in reasonable quantities, yet classed as a whole, fruits are poor in nutriment. A few fruits, however, contain a considerable quantity of either sugar or starch, and therefore have a larger food value. This group of more useful fruits embraces: dates, prunes, raisins and grapes, figs, cherries, bananas, oranges, grapefruit, apples and pears.

RESERVE FOODS

The reserve foods comprise the *fats* and *oils*. It is a common tendency for those afflicted with tuberculosis to discard the fatty portions of meat. This is a mistake. For while the taking on of a large amount of surplus

* Like all generalizations, this one has its exceptions, for honey disagrees decidedly with a few persons.

fat is not only undesirable but liable to be definitely hurtful, yet the sufferer from this disease does on the average require a little more fatty food than the well person, a need which meat fat helps to fill. Milk, butter and cream, are also among the best means through which the necessary amount of fat may be obtained. Then too, the fact that oleomargarine is, for adults at least, virtually as healthful a food as butter, may be worth considering.*

Olive oil, or the cheaper cotton seed oil (salad oil), which is equally healthful, taken on salad or swallowed with a pinch of salt, may be used to lend variety to the menu. Many nuts have a large oil content, peanuts and peanut butter being particularly valuable in this respect. If eaten in great quantity, however, nuts are apt to disagree. Among the ordinary vegetables, the soy bean is the only one worthy of note as a source of fat.

Cod-liver Oil. Patients often inquire concerning the value of cod-liver oil. This oil has the advantage of ease of digestion and assimilation, and also has a high vitamine content. It therefore ranks as one of the useful reserve foods. Whether or not it has any other beneficial quality is undecided. Exceptionally the administration of cod-liver oil is of considerable benefit, but ordinarily the other reserve foods mentioned serve the purpose equally as well, are less disagreeable to the taste, and are cheaper.

Food and Fever

The old maxim that one should "starve a fever" does not usually hold good in tuberculosis. Based on the well known observation that during fever the ability of the

* Oleomargarine is however deficient in vitamines; therefore, if possible, butter should be fed to children, who have most need *for* these vital principles.

body to care for and make use of food is inclined to fall below par, this time-worn saying contains more than a grain of truth; but it is also to be remembered that the fire of fever burns up the tissues of the body rapidly and wastes its store of fuel, so that the actual need for both fuel and repair material is increased. Both of these facts must be given due weight by the sick person in solving his own problem. In this connection, one point deserves special mention. When attacked by some acute febrile disease of short duration it often proves wise to curtail one's dietary to a considerable extent. In tuberculosis, however—a disease whose course is commonly long drawn out—the matter has a different aspect. One cannot "starve the fever" indefinitely without at the same time starving the patient beyond hope of recuperation. In keeping with these deductions, when formulating a practical guide for oneself, one should endeavor to avoid both extremes. Expressed in a word: **When fever occurs, if there be no marked evidence that the food disagrees, the ration should be a fairly large one, but the crippled organs should be spared as much as possible by eating food that is easily digested.**

Be the cause fever or what it may, at some time or other during the illness, very probably there will arrive a period when some one of the digestive organs (for example, the stomach or the bowel) refuses longer to work properly. Coming at a time when the general condition is often critical indeed, the rather natural tendency is to attempt to force even more work on the rebelling organ. This is a mistake, and may only serve to make the strike a complete one. As a rule, if the food supply be temporarily cut down, the distressing period will be tided over, and in a short time the organ will probably resume its normal functions. In some instances it is wise to give the stomach and bowel a complete rest for

a day or two. It need not be feared that the cutting off of the rations entirely for this *brief* period will have serious consequences. If the results be carefully observed, one will usually see that the short time lost has been paid back with interest through increased efficiency.

The Appetite's False Signals. Someone has said that "hunger is the best sauce," and certain persons, taking the appetite to be an infallible signal indicating accurately the needs of the body, firmly believe that one should eat only when hungry, and only those foods that the appetite desires. Probably at one time hunger *was* Nature's sign that more food was required, and the absence of hunger signified with equal accuracy that no food was needed; yet it is only necessary for one to be seriously ailing oneself in order to realize what a serious error it would be to accept the appetite as a reliable guide. Many a decidedly sick person would have literally starved to death if he had trusted to his appetite, which totally failed him at a time when his actual need was urgent in the extreme. Concretely applied, this means that he who is desperately ill must ofttimes make himself eat, even tho the very thought of food is repugnant. Of course it is not wise for him to overload his stomach; but if he is to recover, his body must be supplied with sufficient food and power material at all times to keep the machine running.

Here let a mental memorandum be made of the fact that the taking of a moderate quantity of food in the absence of the hunger-urge is not to be considered as forced feeding in the sense of the word "stuffing," which will be alluded to again later. On the other hand, owing to the ease with which in this extravagant age, one's desires may be gratified, the art of fastidious eating has led to the development of numerous highly perverted tastes. Often the appetite is unusually keen; it may

then be necessary for one to leave the table while still hungry. Again, articles are desired that are entirely out of reason. Is it not apparent, then, that while personal taste may be humored to as great a degree as is compatible with one's own true needs and capacities, the hunger-urge is never to be accepted as an entirely trustworthy guide to the requirements?

Through training and watchfulness, however, a treacherous appetite may be made more dependable.

Appetite Invigorators. Notwithstanding the truth of the foregoing statements, the fact cannot be gainsaid that food eaten with relish is more likely to prove useful than if eaten merely because it is needed. Hence every means should be taken to encourage the appetite. The best appetite sharpener is the open-air life combined with regularity in eating; but it should not be forgotten that the special senses also play an important rôle; that proper cooking and attractive serving of the food, plus a reasonable variation in the items of the meal, hold second place as stimulators of the appetite juices. The appetite of the invalid must sometimes be coaxed along for quite a period, and to this end no pains should be spared to prepare the food in an inviting and tasteful manner. A good cookbook should be kept at hand and consulted at frequent intervals. With this, and the use of a little ingenuity and forethought in daintily garnishing the dishes, a touch of newness may be given that will act as an efficient appetite promoter. **In the end, little cares of this nature are often life-saving.**

With the same idea in mind, a moderate use of some of the edibles listed herein as worth little as true foods, may at times be made to fill what is then an important function—the awakening of a jaded appetite. Relishes and spices such as mustard, Worcestershire sauce, vinegar and condiments; as well as salads and soups—all

worth little in themselves—through giving flavor and zest to the food serve to tickle the palate and so stimulate the flow of digestive juices that a call is created for better foods, which can then be eaten with pleasure. Among appetite teasers must also be placed beef extract, a preparation once highly vaunted as a food but now known to have little worth except as an agent for preparing the way for real foods. Tomatoes, too, have little true food value, yet rank high as appetite bracers. Altho these appetizers are worthy of use at certain times, if indulged in habitually or taken in excess the good effect is apt to be lost and direct harm may be done; so their use should be interdicted unless actually called for.

On Skipping a Meal. As previously intimated, if you have lost much weight and are in urgent need of every ounce of food you can assimilate, it would be folly for you to wait idly for any length of time for your appetite to cry out for food ere you eat. Nevertheless, if you have found it necessary to force yourself to eat if you eat at all, it may be worth while to occasionally omit one or more meals, hoping thereby to acquire a genuine desire for food. "It is better to eat yesterday's dinner than to-morrow's," runs the saying; and it is a fact that if you sit at table merely from habit or duty and dally with your food in a half-hearted manner, by skipping a meal or two now and then you may give your appetite an opportunity to catch up with your actual needs, and thus develop a genuine pleasure in eating. *Caution:* This plan is hardly practicable unless the body is at least fairly well nourished, so that it is safe to cut the daily ration temporarily.

The Heaviest Meal. Patients often inquire which meal should be the heaviest. This is an individual matter, depending partly on previous habit, on personal

taste, and other variable factors. On the whole, the digestive organs work most efficiently after a fairly long rest, and when the bodily temperature is comparatively low; so for both reasons one should eat a hearty breakfast, thereby gaining a good start each day while the conditions are right. For patients whose fever is highest near the middle of the day, it is often an advantage if the heavier of the other two meals be taken at night. In other cases, the eating of a full meal at night interferes with sleep. Discretion must be used; judgment in each case will settle the problem.

Food on Hot Days. A related matter is the question of food for hot days. During summer weather the requirements of the body are less, and as the digestion is sluggish at this time, the amount of food can in many cases be slightly reduced with benefit.

Fads in Eating. All sorts of dietaries, ranging all the way from fasting or the "starvation cure" to the "stuffing" habit, have been recommended to those afflicted with tuberculosis. At one time the drinking of warm beef blood was highly praised; now beef blood is looked upon as having little or no more value than fresh meat. A diet composed almost entirely of meat has had its advocates, while to-day meat prohibition, or "vegetarianism," has many followers. On every hand some friend may have a special system of eating to recommend. To such persons the searcher for health should ordinarily turn a deaf ear, no matter how sincere their entreaties or how alluring the claims made for these one-sided bills-of-fare, which usually turn out to be merely traps for the unwary.

Vegetarianism. That perfect health has been maintained entirely without the use of animal food, and that certain persons live more healthful and happier lives if meat be excluded from the menu, has been definitely

established; that others, both among the well and among the sick, have signally failed to thrive on similar rations is also undoubted. Neither of these truths furnish the answer to the question whether or not it is prudent for the average individual to omit flesh from his diet.

In America, at any rate, through centuries of habit and training the body has acquired the ability to extract the substances that it needs most easily from a mixture of both animal and vegetable foods. Then, too, even most vegetarians lay stress on the value of a good appetite as an aid to digestion; in this connection how many are there who, at the outset or for quite a period, evince a real desire for purely vegetable foods or for a meatless dietary? Many never get over the primary feeling of distaste; some stomachs permanently resist re-education along this line. Again, the selection and preparation of properly balanced menus of exclusively vegetable foods require considerable study and care, to which few will devote the time; and without which such a dietary will probably prove worse than useless.

As it is a poor plan to experiment during sickness, the common-sense conclusion is that, barring a valid contrary reason, unless the sufferer from tuberculosis be under the immediate control of a physician **who not only has a thorough understanding of tuberculosis but of vegetarianism as well**—a rare combination—he will as a rule best serve himself by embodying in his dietary both animal and vegetable foods.*

"Honor to Whom Honor Is Due." To the vegetarian must be given credit for accentuating the dangers that lie in wait for those who habitually gorge themselves on meat or other protein foods, and for demonstrating conclusively that most of us could increase our chances

* Persons previously accustomed to subsisting on vegetable aliments alone, if their experience has proven that such rations agree with them, may continue to follow their ordinary custom *in this* matter.

of living out our allotted span by lessening the amount of flesh and other proteins we consume.

In suitable quantity protein foods are vitally necessary, but if taken in so great an amount that other foods are slighted, virtually only one of the needs of the body will be satisfied. Above all else, proteins are repair foods—builders of muscle and brawn; they do not furnish in sufficient amount the energy and power which is just as pressingly demanded. In addition, the overloading of the stomach with such one-sided rations frequently leads to the accumulation of poisons that not only account for many disagreeable sensations, such as headache, a feeling of logyness, and bowel disturbances, but which tend to produce in time serious disease of the kidneys, the circulatory system and the liver.

Another Common Transgression. Another common mistake is eating too much fruit and the more tasty vegetables, that serve well as "trouble makers" but contain little nutriment. Unfortunately the season for fresh fruit and green vegetables arrives just at the time when the stomach and bowels are, due to the hot weather, in ripe condition for an upset. Remembering the injunction that less heavy food is required during summer weather, certain patients are prone to overload the stomach with cantaloups, peaches, apricots, tomatoes, cucumbers and the like, at the expense of the digestion. A little fruit is ordinarily beneficial; but an excess, especially during hot weather, is often worse than a full general diet. Those who have an especial liking for fruits and for vegetables of this class or who place too high a faith in them, will do well to note carefully the fact that beyond their virtues as laxatives and as sources of mineral matter and vitamines (and these effects and constituents are of course important), fruits in general and vegetables of this nature have little to recommend

them to a prominent place on the bill-of-fare. The habit of eating a large amount of this class of foodstuffs is only too often a breeder of serious trouble. Moreover, persons who carry this idea to an extreme, wonder why they do not gain weight and why they suffer so much from gas, from nausea and vomiting, or from diarrhea.

A Popular Misconception. How to Eat Fruit to the Best Advantage. The view is widespread that if fruit and cream are eaten together or if one drinks milk at the same meal, this may lead to some undesirable reactional disturbance in the stomach; furthermore, the same popular opinion tells us that if the fruit be eaten alone, or without the milk or cream, no disagreeable effects will occur. Investigations and experience, on the contrary, have proven that fruit and cream (or milk) rarely, if ever, form a harmful combination in the stomach, and have shown that the belief just cited is as a rule a myth, pure and simple. As a matter of fact, a meal made up altogether, or chiefly, of dairy products—such as milk, cream, cheese, junket, eggs, etc.—plus fruit, is perhaps the ideal way to eat fruit.

True, difficulty sometimes arises following a meal in which fruit and milk, or cream, have been included. In this case the tendency is to take for granted that these items have been the cause of the difficulty; whereas the real source of the trouble is overlooked entirely. Usually it is the *starchy* food of some variety incorporated in the same bill-of-fare that must shoulder the blame.

For example: Let fruit and one or more dairy products be combined and no disturbance is produced. Add bread, a breakfast food, potatoes, or a generous slice of cake to this menu and, if the stomach is inclined to be sensitive, at once difficulty is experienced. Or let merely

the starch and fruit be combined, and trouble is liable to arise. Thus it is shown that the starch-fruit combination is often the unsuspected source of difficulty, not the cream or milk-fruit combination. The reason is this: Most fruits contain quite a bit of acid, which has a tendency to retard the digestion of starch (which requires an alkaline or neutral medium for its digestion) and to permit fermentation.

If it is impracticable to omit starches altogether from meals during which fruit is eaten, the ill effect may be minimized by selecting fruits that contain a relatively small quantity of acid, such as ripe, mellow apples, pears, peaches, etc.; reserving the more acid fruits for lunches between meals.

All in all, fruit will probably be cared for to the best advantage if partaken of at one of the lighter meals of the day—a meal in which dairy products have the most prominent place. Preferably, only one variety of fruit should be eaten at one meal. *CAUTION:* In carrying out this plan, if you are in urgent need of all the food you can assimilate, you should be careful not to cut the other and more nutritious items of the "fruit meal" below the safety limit. Let it be understood, also, that the remarks under this head are not to be construed as definite and absolute rules: their main purpose is to correct a popular fallacy and to suggest the way for each individual to work out his own dietary problem.

The "Milk Cure." Some there are who, appreciating the immense food value of milk, attempt to live on it alone. This, too, is an error. For while milk is an excellent food and contains all the food elements, these ingredients are not present in the proportions required by the body; so milk is not satisfactory as the sole source of nourishment, save under unusual and special

circumstances. In order to obtain a sufficient amount of one constituent one would necessarily acquire an excess of another; further, so much milk would be called for that the capacity of the stomach and other organs to handle it would be severely and perhaps over-taxed.

The Facts of the Case. While it is perfectly true that most of these so-called fad dietaries are useful when exceptional conditions are present, if used for a limited time and for a definite purpose only, the ordinary tendency is to make one or the other of them a hobby, which is ridden till serious consequences ensue. Hence, in all cases before launching upon a one-sided diet of any nature, one would do well to consult a physician well informed both upon food values and tuberculosis.

The "Stuffing" Evil

Stuffing the Body Like Overcrowding the Furnace. Since it was learned years ago that by eating an amount of food well above his normal requirements, the consumptive could often obtain a rapid and pronounced increase in weight, the practice of forcing the diet of the pulmonary invalid has become common. Despite the fact that "stuffing" has been shown to lead to catastrophe much more frequently than it has proven of benefit, the plan is unfortunately still in fairly wide use to-day. Lest the sufferer, reaching out for a support, find to his sorrow that overeating is merely a straw which gives way beneath him, it is necessary to state in as forcible a manner as possible, the warning: Do not exchange your chances, perhaps your only chance, of complete restoration to health, solely for a gain in weight—a mere improvement in appearance, which may but mask the progress of your malady until it is too late.

A Lesson from Experience. To all who have ob-



OLD AND NEW RATIONS

Formerly it was customary for persons afflicted with tuberculosis to stuff themselves in order to grow fat, as exemplified by the upper dietary photo with its between-meal luncheons. The lower photo shows a meal composed of the various food groups in generous quantity but without overfeeding—the common-sense ration.

served closely many patients who have followed the plan of forced feeding, the moral is plain. If one has seen the pale, lean, haggard consumptive compel himself to swallow three large meals a day, and force down a glass or two of milk and several raw eggs after each meal, besides consuming additional quantities of milk and eggs between meals and at bedtime; if one has seen the gaunt, lean frame begin to fill out a little, and noted how the invalid's emotions changed from discouragement to joy as his body rounded out with flesh, until on casual inspection he appeared well and strong; if one has meantime observed how this brightened outlook, combined with the moderate abatement of his symptoms, have not only caused the individual to actually feel well, but have firmly implanted in his mind the belief that he has permanently conquered the plague: after this remarkable change has occurred, if one has noted how excessive optimism has led the victim to lessen his efforts in other ways, to over-exercise when he should be resting, and to do many other harmful things; if one has remarked how this continued overtaxation of the capacities has in turn at last caused the invalid's stomach, his heart, kidneys, or other organs to give way under the strain, and has seen how through the effect of one or more of these influences, the soft, flabby fat has rapidly melted away, until he has reached a condition as bad or worse than before, while the feeling of elation and great gladness has changed to hopelessness, to lack of faith and despair—if one has witnessed these things, not once but many times, no further evidence will be needed to convince one that forced feeding is a dangerous remedy.*

* Forced feeding also violates the principle of functional rest. For each additional ounce of food eaten, the greater must be the supply of oxygen, which makes it necessary for the patient to breathe deeper or more rapidly. As it is just as important to obtain relative respiratory rest as it is to obtain muscular and

Is Forced Feeding Ever Advisable? Altho these things emphasize that it is necessary for each individual to guard himself to the utmost against stepping into this pitfall, yet they are not intended to carry the meaning that a diet above the average amount is never of value. If one keeps in mind that weight alone is virtually useless, and looks upon it as only one indicator, or, at best, as merely a means to the end; that weight above a reasonable amount is just so much excess baggage to be carried around, which serves only to make the heart and other organs perform needless work—then and then only, in certain cases (usually only when other methods have not proven satisfactory), the diet may be cautiously extended in moderation provided the effect be carefully watched and the extra food be taken for a limited period only. The rapid development of the outward veneer of health under this regimen is quite encouraging to the one who is sick; but it should not be forgotten that a relapse due to excessive enthusiasm and overdoing, may mean failure. **In those exceptional cases where the procedure seems justifiable, before putting the plan into operation, one should fortify oneself well against falling a victim to the false feeling of security which will almost inevitably come later.**

When it appears profitable to force the diet, the taking of an extra glass of milk or two, or its equivalent, and one or two raw eggs—between meals—and perhaps also a similar lunch at bedtime, is a convenient way of

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mental rest, in eating the endeavor should be to strike a balance between the repair requirements and overwork for the lungs. Later, as the disease becomes quiescent, the quantity of food may, if necessary, be increased to meet the muscular needs. I do not wish the impression to be gained, however, that unhappy results always accrue when overeating is practised. Even when this plan is pursued indiscriminately or haphazardly, in many cases no great damage will be done. On the other hand, serious consequences (consequences that, in the long run for one reason or another, are often responsible for death) occur in so many instances, following the execution of this apparently simple and innocent procedure, that it is essential for one to be forewarned of the hidden dangers.

accomplishing the purpose. One glass of milk and one egg for the lunches will be sufficient in most cases. The bedtime lunch should be omitted in all but the most stubborn. Some persons digest the milk and eggs more readily if they are made into a sort of egg-nog. In making this drink, the egg should be beaten separately, making sure that no free particles that may cause gagging, remain; then placed in the milk, the whole beaten again, and a little seasoning such as nutmeg or cinnamon added, if desired. If, however, the milk and eggs taken in this way disagree, perhaps producing fermentation or diarrhea, they may be prepared in some other manner,* or other additional food taken, the aim being to add the least amount that will serve the purpose.

A Happy Result from a Restricted Diet. Persons who have been crowding their diet, but who find themselves still stationary in weight, or even losing, may take heart by bearing in mind that the coveted flesh may sometimes be obtained by cutting down in reasonable degree their allowance of food, and by heeding the other rules for eating mentioned herein. I have frequently

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* Digestion of the milk-egg combination may sometimes be facilitated by adding two hundred and forty drops of dilute muriatic (hydrochloric) acid to each quart of the mixture, after which it is again stirred well or thoroughly beaten.

IMPORTANT: Note that the *dilute* acid is used, and before making concrete application of the plan, two points should be given careful attention: (1) Now and then a stomach is met with that is already over-supplied with hydrochloric acid. (2) The dose of the acid suggested above is several times larger than ordinarily prescribed. For these reasons it is imperative that it be made reasonably certain (preferably through counsel with a physician) that there is no factor in your own case that may make so large a dose unsafe. If previously one has been troubled with *burning* in the stomach, this indicates the presence either of (a) an excess of the normal hydrochloric acid or (b) the presence of abnormal acids. In the latter case, the taking of hydrochloric acid may prove beneficial. In the former case it will only add insult to injury. Hence, in the absence of a physician, if burning is present the hydrochloric acid method is to be taken up very cautiously, if at all. In this case, only one teaspoonful of the acid should be used at first, or until assured that this does not increase the burning.

If desired, hydrochloric acid may be used in the same manner to assist in the digestion of milk alone.

seen patients who were consuming large quantities of food with nothing to show for their efforts but indigestion, disgust and discouragement; who, after putting into effect the suggestion that they *eat less but eat properly,* were overjoyed to find that by merely giving the digestive organs a fair chance to work within their capacities, they soon began to put on solid and substantial flesh. In some cases weight was put on following even a quite marked restriction of diet. *NOTE:* The plan of reducing the intake of food below the standard amount is not, however, recommended unless there be good ground for suspecting that it will prove useful.

Beverages

Water is the safest and best beverage and, unless there be some reason to the contrary, should be drunk freely. In addition to the water taken in food, in health,* two quarts of water daily, either in the pure state or in some beverage, is required by the average individual. Ice-water delays digestion slightly; it should therefore be used sparingly or banned entirely, as occasion demands.

Tea and coffee both contain the harmful astringent, tannin, and also respectively yield the identical drugs, thein and caffein; if used at all, they should be consumed in moderation. There are several preparations

* There is sound basis for the belief that during fever not only is more than the ordinary quantity of water necessary, but that water drinking helps materially to lower the temperature of the body. In selected cases of acute illness copious amounts of water, often eight quarts daily, have been administered, with apparently very beneficial results. Altho in a long drawn out fever, as may occur in tuberculosis, the administration of large quantities of water is a different question, and the ability of the system to cope with or care for such quantities of liquid must be given careful consideration, nevertheless it is probable that more water could be taken by the average patient with benefit, and if the digestion is good, the stomach not dilated, and the circulatory system and kidneys fairly sound, during fever it may prove well worth while to cautiously gradually increase to a considerable degree the amount of liquids taken.

of whole bean coffee on the market, such as "Dekoffa" and "Kaffee Hag," from which the caffein has been in large part removed, which provide one way out for the confirmed coffee drinker. "Postum," "Drinket" and similar substitutes satisfy the craving of other persons, and are perhaps more preferable from the health standpoint. Chocolate and cocoa are less stimulating than coffee and tea, contain a greater proportion of nutriment, and are on the whole more wholesome beverages.

An Error to Avoid. Much stress has been laid by some persons on the danger of water drinking at mealtime. It appears from recent investigations, however, that in the absence of digestive disturbance or a dilated stomach, little if any harm occurs. Nevertheless, if liquids are used to moisten the food so that it will slip down easily, an important function of the saliva will be defeated. Bear in mind that the saliva is one of the digestive juices, and that its intimate admixture with the food is essential; so whatever liquid is partaken of, do not use it simply to wash down the food.

When the stomach is known to be dilated or if distress follows eating, especially if vomiting occurs, it is often an advantage to take the meals dry and to take the liquids say an hour before eating.

What About Alcohol? Frequently the question is asked whether some mild alcoholic drink may not be taken in moderation with good effect. In some degree alcohol furnishes energy to the system, and therefore ranks as a food-sparer; it sometimes serves to whet the appetite and to invigorate a sluggish digestion, and in certain instances it may do good in some other manner. On the other hand, it is now a well recognized fact that alcohol decreases the resistance to almost all diseases, including tuberculosis; further, all persons who use alcohol run some chance of contracting the habit;

again, even a small drink tends to so mask the sensibilities of the patient that for the time being he feels much stronger and better, and is liable to do imprudent things.

In conclusion, it may be said that the good effect of alcohol can usually be obtained in a safer and better manner by the use of some other agency, and that if carelessly used the harm is almost sure to overbalance the good. If taken, alcohol should be considered a medicine, and if used for its effect on the appetite and digestion should be taken before or during the meals, preferably in the form of a glass of beer or ale, or malt extract or one of the milder wines.

LESSON XI

THE ELIXIR OF HEALTH, FRESH AIR—ITS USE AND ABUSE

WHO has not at some time felt the call of the great outdoors, and sought recuperation through a longer or shorter sojourn in this enchanting realm of Nature? Do you who have responded to the summons recall how, perchance, your appetite was so sharpened after a few days spent in the open, that you could hardly wait for the food to thoroughly cook; and how the coarse edibles, seasoned with the spice of the outdoor air, seemed the choicest of viands? Do you remember how your nervousness left you, and your surprise at finding yourself sleeping soundly on the hard, rough bed, right next to Mother Earth? No doubt you recollect how delightfully fresh you felt, how keenly invigorated and exhilarated by the tang and sting of the cool biting air; how full you were of energy and vim—in fact, so strongly imbued with the zest of life that you just knew that every organ in your body was getting back on the job!

Yes; and how you became hardened and toughened till you could hardly believe it was really you, who had developed into this brawny, red-blooded individual who could withstand rigorous exposure, violent changes of temperature, drafts and dampness, without harm resulting. How astonished you were to discover that you no longer picked up every "cold" that came along, but now enjoyed a remarkable freedom from these infections to which you had formerly been so susceptible!

Pleasant memories of outdoor excursions of this sort are cherished by nearly everyone. Yet how many there are who fail to apply in their everyday lives the lesson drawn from these experiences! Yet if wisely indulged in, the outdoor life brings to the victim of tuberculosis all the blessings enumerated above, and even more.

The Right and the Wrong Use of Open Air

The open air treatment of tuberculosis has been in use for three-quarters of a century, time having conclusively proven that the early confidence placed in the method was entirely warranted. Notwithstanding the many merits of fresh air, however, it remains a sad fact that an erroneous interpretation of the term, *outdoor living,* as applied to tuberculosis, has led frequently to abuse of this valuable remedy and to a consequent and needless sacrifice of untold numbers of lives. In order to make sure of obtaining the maximum benefit from this one of Nature's remedies, it will be well at the outset, therefore, to see what has been the cause of so costly an error.

Outdoor Living Does Not Mean Roughing It. Because the words "The Great Outdoors" are in some quarters indelibly associated with the idea of continual *wandering* in Nature's broad dominion, the belief is still widespread that simple living in the open is synonymous with roughing it. It is true that in rare instances persons suffering from tuberculosis—some even in an apparently hopeless condition—leaving civilization behind, have sought, and at last found health, tho living under very trying and unfavorable conditions, in some wild, rough country. There, living constantly under the sun and stars, drifting about from place to place, subjecting themselves to physical strain, sometimes suffering the pangs of hunger, of thirst, and under-



WHERE THE BURRO DOES THE WORK

This young lady has graduated from rest to exercise, but is permitted to walk but a short distance. However, she has found a safe and fairly certain mode of transportation and pastime. Other hints on pastimes and amusements may be found on page 457.



going other deprivations—nevertheless they have finally emerged into the world with their formerly wasted bodies now filled out and glowing with health—once again real men and women.*

Persons who have obtained the prize in this way usually cannot say enough good things of "getting close to nature," and "roughing it"; and speak with inspiring fervor of their experience, urging others among the afflicted to do likewise; not realizing that to the great majority they preach only—*disaster.*

What of those others who follow in the footsteps of the more fortunate? Here and there an exceptional individual returns, triumphant; but at least nine out of ten succumb to the too heavy demands upon bodies already crippled and weighted down with disease. Homesickness, despondency, scarcity of good food, over-exertion and exposure, write the story of wrecked hopes.

The exceptions serve only to emphasize the rule that **hardships and exposure have no place in the rational application of fresh air to active tuberculosis.** To say that roughing it has shattered the last chance of thousands upon thousands tells only half the tale.

Can *you* afford to take the gambler's chance? Are you willing to stake all, on less than one chance in ten? Or do you not believe it is better to stick to the method that has proven best for the great majority? Altho the out-of-doors is Nature's boon to the sufferer from tuberculosis, one should never let slip the fact that **the**

* For such persons the mental rest obtained through release from the trials and worries of business and perhaps from the cares of the home, the feeling of faith or at least revived hope awakened by stepping into the unknown, the complete change in habits and environment, the bracing effect of the clean fresh air, the stimulating odor of the outdoor verdure, the new sights greeting the eye and the other attractions of the free life under Nature's canopy—and in some instances the change to a more salubrious climate—some or all of these things, or similar influences have been sufficient to outweigh the injurious effect of over-exertion, exposure and the like, and to restore them to rugged health.

administration of fresh air must be accompanied by a generous dose of common sense, and that it is essential for the rest treatment to be carried out at the same time. True, Nature is the great restorer, but even Nature must be given a chance.

The Effect of Fresh Air

Before examining the rules that govern the use of fresh air, it seems advisable to spend a little time in ascertaining just how the good effect of outdoor living is brought about. At first sight a consideration of this matter may appear technical rather than practical—hence, unnecessary. If, however, one will show a spirit of forbearance and patience while reading the next few pages, for the purpose of learning a little of the *how* and *why* of fresh air, later when the knowledge gained is translated into definite and effective action, thus extracting from fresh air the whole kernel of its value, one will see that the little preliminary study has been well worth while.

Original Conjecture versus Modern Proof. During the last decade or two the conception of the effect of outdoor living has undergone a radical change. Early ideas and notions, based almost solely on surmise and assumption, under the searching light of science have been blotted from view, giving place to a new and more accurate understanding—an understanding built upon the solid foundation of proof yielded by numerous painstaking investigations.

This statement demands the immediate and forcible qualification that **the discovery that the old inferences were in many respects faulty and are no longer tenable, casts not even a miniature cloud on the value of outdoor living, whose usefulness is beyond dispute.**

The questions are often asked, What is meant by

"fresh air"? and, To what properties does fresh air owe its good effect? The answer to these questions cannot in its entirety be made offhand. In one phase, however, the answer can be promptly and concisely stated:—

Fresh Air Contains a Minimum Number of Germs. Due to the diluting effect of the continual intermixing out-of-doors of the impure air with the pure air, and to the germ destroying action of sunlight, air fresh from the outside is comparatively free from germs of all varieties.

Keeping in mind this basic and vital difference between air that is, and air that is not, fresh, we may now proceed to the consideration of those attributes of fresh air that are less readily explained.

Some Everyday Incidents Give the Clue. (1) At some time or other have you not remained in an indoor ill-ventilated room until finally the air became so warm, stagnant, and "muggy" that you felt stifled and apparently almost suffocated? Then, on seeking relief by stepping outside, as the sharp draft of cooler air *struck you in the face*, have you not immediately felt refreshed and invigorated? Of course you have noted this; but have you ever stopt to think that the relief was *instantaneous?*—that you were freshened and braced at once, **before there was time for you to take one breath of the new atmosphere?**

(2) Likewise, on some warm day, after spending a half hour admiring the greenery in some glass-roofed conservatory, with its pent-up, warm and humid, motionless monotonous air—at the end of the little journey through the passageways, on emerging once more into the unconfined, restless, cooler outside air, have you not had a similar feeling of immeasurable relief, as tho a heavy load had just been lifted from you? Moreover, has not this relief come the moment you have passed

through the portals of the conservatory—**before you have had any opportunity to inhale the fresh, clear, deliciously stimulating outer air?**

(3) Again, is there anyone who has never known the keen stimulating feeling, and the pleasurable, healthful glow that follows a cold bath? Odd as it may seem at first thought, the benefit derived from living in the open and the benefit derived from a cold bath are brought about in much the same manner.

It will be shown in a moment, that the commonplace experiences just described, taken together, furnish the master key to the merits of fresh air. First, however, it seems desirable to attempt to dissipate the clouds of misconception which so commonly hinder one from obtaining an unbiased and open view of the matter.

Some Newly Discovered Facts. Unfortunately, space will not permit the presentation of details; it can only be stated that a great mass of evidence has accumulated to show that—

1. Inside and outside air differ much less in their contents of oxygen and waste products* than has formerly been supposed.

2. The body can utilize only a small part of the oxygen present in ordinary air. Even in an indoor room, unless the atmosphere be "close" and stale indeed, the amount of oxygen is more than sufficient for the respiratory needs of the healthy person, and for the sick also, save under exceptional circumstances.

3. The gases and effete matter eliminated during outbreathing exert little ill effect upon one, unless these

* Among these waste products, carbon dioxid is thought by many persons to be especially injurious. Strange as it may seem, some newly discovered facts strongly suggest that an excess of carbon dioxid in the body to some extent protects against and retards the progress of tuberculosis. In this connection it is significant that a concentration of less than 5 per cent (a concentration which not rarely occurs in the body) definitely inhibits the growth of tubercle bacilli.

substances saturate the air to a greater degree than occurs in the usual indoor room. Lest this last statement lead to misunderstanding, a word of explanation seems in order: Altho the waste gases eliminated from the *body* are less injurious than was formerly supposed, the fumes given off from certain articles of the household equipment—for example, the fumes produced as a result of the burning of natural or illuminating gas, as well as the gases escaping from improperly ventilated stoves and the like—are decidedly harmful.

Local versus General Effect and Physical Qualities versus Chemical Make-up. Here it may be well to pause a moment and ascertain just what it is you complain of when the air is uncomfortable. Do you say: "I am suffering for the lack of oxygen," or do you exclaim: "There is too much poisonous matter in this air! —I cannot stand it"? No; very probably you say neither of these things. What you are really much more likely to say is: "How cold and damp the air is; and isn't the wind raw and piercing?" Or on the contrary, you reveal your feeling in some such manner as this: "How warm and steamy it is to-day; how close and oppressive! There does not seem to be a breath of air stirring."

Does it surprise you to find that in one direction or the other you have found fault with the *physical* properties of the air—such as the precise amount of air *movement,* its *temperature* and its relative content of *moisture;* that you have not been half so concerned about the exact *chemical* make-up of the air as you had thought? An effort will now be made to show that in your complaints you have hit upon three of the chief factors upon which the effect of air, for good or bad, depends. For a careful consideration of the facts itemized above, and of other recent discoveries along the same line, leads to the conclusion that air which is not fresh works a two-fold injury, as follows:—

(1) It offers the individual every chance of taking more and more germs into the body. In this way, the air that is *breathed* in is a menace. This may be looked upon as a local effect.

(2) It undermines the resistant forces of the *whole* body, rendering it incapable of putting up an adequate defense against germs and disease. This *general* effect is brought about not only by the air that is *breathed in*, but by the air that *surrounds the body* (probably chiefly through the latter medium).

Viewing the matter from a different angle, it is seen that a large part of the benefit from fresh air, perhaps its principal benefit, is derived from its action on the *surface* of the body. Thus, it is owing to the fact that the skin is exposed to a continuous air bath (for even when one is drest, air permeates the clothing to a greater or less degree)—this air bath having a stimulating effect similar to the cold water bath—that the oft-times wonderful results of the outdoor life should be in large part ascribed. Once the air reaches the surface of the body, through the nerve terminals in the skin, and otherwise, health promoting processes that reach the most distant parts of the anatomy are instituted.

Moreover, in one way or another, air as a surrounding medium *abstracts heat* from the body to a larger or smaller extent. The removal of heat in turn sets the bodily machinery in motion to counteract the loss. In responding to this new demand each and every cell is spurred on to do more work,* and (provided that this increased demand does not exceed the ability of the cells to respond) this increased work will mean better

* *Work*, in this sense, is not to be looked upon as contrary to the health item, rest, as described in Lesson IX. A distinction is to be made between *useful* work (that is, cellular activity which strengthens the function of each organ and contributes to the general fighting efficiency) and needless work, such as unnecessary physical labor, which calls for an output of energy though accomplishing nothing from the health standpoint.

work, and a building up of the general vitality and resistance to disease. Furthermore, research has shown that the precise amount of heat removed from the body depends chiefly on (a) the *temperature*, (b) the *movement*, and (c) the amount of *moisture* in the air. In other words, it is to the physical qualities of fresh air, such as its temperature, movement, etc., rather than to its exact chemical make-up, that the good effect of fresh air must be largely assigned. Of course, it is essential for each of these three factors to be regulated in accordance with the reactive power of each individual, regarding which practical suggestions will presently be given.

Summary of Effect of Fresh Air. In a word, it may be said that the influence of fresh air is more a general one on the whole body than on the lungs alone. Inside air predisposes to tuberculosis by so wearing down the general vitality that the individual falls a ready prey to most diseases, including, of course, tuberculosis. The danger is accentuated because of the comparatively large number of germs present in impure air. Outside air, which contains a smaller number of germs, is a general tonic to the whole body, augmenting its defensive forces, and bracing, hardening and building up the individual, so that he is enabled to withstand much exposure and to effectually ward off disease. Thus, he is to a large extent protected against tuberculosis; if already afflicted, he is aided in ridding himself of the malady.

The Importance of Fresh Air Emphasized. Altho the newer discoveries have shown that the benefits of fresh air are brought about in a somewhat different manner than old tradition and hasty speculation would have had us believe, fresh air is nevertheless highly essential to health. More, owing to the fact that fresh air is now known to give double value, through its wholesome effect both upon the lungs and upon the body as

a whole, it would seem to be even more necessary to recovery than it has heretofore been generally considered.

It is not unlikely that the above description of the action of fresh air at first appears a little confusing, even uncalled for. If for the present, however, the reader will content himself merely with making a mental memorandum of the matter, as he reads on in this lesson, under the discussion of drafts, fog, bodily warmth, clothing, heating systems, etc., he will find the facts concretely applied, and will probably be convinced that the space given to the discussion of the why and wherefore was not wasted. So, too, when discussing climate (see next lesson) the basic truths appearing herein will be again referred to.

The Nose, an Inefficient Sentinel. Under ordinary circumstances, if a number of persons are congregated in an improperly ventilated room, conditions are right for producing just the effect that is not wanted. The air tends to *stagnate,* to become either *too dry or too humid,* and to become *overheated;* till sooner or later a "stuffy" feeling is noticed and an odor that is offensive develops. Because in many circles the belief is common that the nose can safely be relied upon to tell when the air is "bad," it seems advisable to lay stress on the fact that this is a decided error. It is important for it to be understood that the nose detects only gross fouling of the air, such as that due to perspiration or to the accumulation of other organic impurities—factors which are not the primarily vital ones. This means that **air is often quite unfit for use long before it is vetoed by the sense of smell.**

GENERAL INSTRUCTIONS FOR LIVING IN THE OPEN AIR

Residence in the Country an Advantage. Whether or not in a given case, it is prudent for one to make a change of climate or to seek rest and tranquillity in a sanatorium, some change of residence, at least to the country, is a great advantage in nearly all cases. The purity of the air increases in direct proportion to the distance from habitations and from cities. In the country is also found an entirely different environment which, with its new and pleasant attractions, completely separates the sick person from the temptations of work and friends, thereby often adding materially to his chances.

Continuous Life in the Open Desirable. Barring unusual circumstances, one should spend as nearly as possible *twenty-four hours out of each twenty-four* in the open air. This does not imply that it is either necessary or wise for the invalid to rest directly under Nature's sky; but it does mean that unless there be a potent contrary reason, he should at all times be supplied with an abundance of fresh, unadulterated air. **The rule holds true whether the patient be in bed or up and around.** Unless also suffering from hay fever or from certain forms of genuine asthma related to hay fever, it may be said that it is impossible for one to obtain too much air, fresh from the outside.

Unwarranted Fear of Fresh Air. How many there are who allow an excessive fear of drafts to interfere with the effective carrying out of the open-air treatment. Strong drafts are, of course, not desirable, but their influence for harm is less marked than many suppose. If it be recalled that moderate movement of the air (that is to say, a slight draft) is one of the highly prized virtues of open air, dread of drafts will be less

common. Night air is the bane of others; yet there is absolutely no real ground for the belief that night air is injurious. As a matter of fact, in cities, owing to the comparative absence of dust and smoke, the night air is the purest and best air. Still others hold that great harm will come from the breathing of damp air during foggy or rainy weather. This apprehension is also unwarranted. Just as extremely dry air is not the best air, so air that is highly saturated with moisture is not the best air. **Yet even decidedly moist air is better than the stagnant, devitalizing atmosphere of a tightly closed room.** Again, there are those who believe that they should remain indoors on cold days. This, too, is an error; for cold itself is an exceedingly valuable stimulant, and, as a matter of fact, many make most rapid progress during the cooler season.

The Rule of Reason. Persons so inclined wish to shut out the air when any slight change in the weather occurs. This is quite a grave mistake. On the other hand it is just as serious a transgression for one to wantonly expose himself: **It is to be distinctly understood that discretion must be used in administering the air baths. One should strive to obtain at all times the maximum amount of fresh air consistent with sane protection from strong drafts, violent winds, dust and extreme cold, and from the direct wetting of the body by a driving rain, etc.** However, one who has become inured to the outdoor conditions is often remarkably resistant to the little ups and downs of the weather, and protection is then less important.

Daytime Apathy. In direct contrast to the views and actions of those who (as just explained) through fear of injury fail to take full advantage of fresh air while they are sleeping, there is another group of persons who, painting with a highly colored brush the

merits of outdoor *sleeping*, with small respect for the wishes and rights of others are wont to insist with almost fanatical zeal that they have their full allotment of fresh air at night; then, just as fog melts before the rising sun, with the coming of the day their efforts evaporate, and they face about completely in their practices, serenely content to pass their waking hours in indoor rooms where the air is stale and stifling, with a most surprizing indifference to their daytime living conditions.

What inconsistency! What folly! There is only one way to get from fresh air all that it offers. He who is putting his heart and soul into the fight will do his utmost to secure for himself fresh air *all the time.* It should always be remembered that *fresh air means life.*

Precautions Suitable to Elderly and Very Sick Patients. Elderly and delicate persons and those suffering from far advanced disease are apt to be especially sensitive to exposure, so for these a more guarded and moderate adjustment of the factors of temperature, humidity and air movement is imperative.*

Moreover, for such persons a definitely graduated change to the new conditions is the safer method, the more so if the outdoor life be taken up during stormy or wintry weather. A few days or a week or two, or in some cases even longer, may be profitably spent in accustoming the invalid by progressive steps to the new plan. Let it be emphasized, however, that those who

* This means that measures for insuring protection from violent wind, bitter cold, immoderate dampness, etc., are more important for patients of this class. If the treatment is carried out in a cold climate, a few of these more delicate patients may never become inured to the same conditions that others will stand with ease; and for some, especially those who have to rise frequently at night, and for those who find that their catarrhal symptoms, such as may be due to bronchitis, are aggravated by slight air changes, a well ventilated room may be the best abode. Nevertheless, the aim should be to harden even these patients to the greatest degree possible. Most surprizing results in this direction are ofttimes obtainable if one is willing to try.

actually require special care are comparatively few, while those who *think* their cases are exceptional are numerous indeed.

Then, too, one should also be on guard, lest the change be made so slowly that it is never completed. Those hesitating persons who, harboring the delusion that in so doing they are protecting themselves, postpone the day for making each little change from week to week and month to month, should realize that through this dilatory action they are actually paving the way for the development of colds; against which the continuous life in the open is really their strongest safeguard.

Also, in connection with colds, it should be remembered that sudden and pronounced *changes* of air conditions are often of more importance than the exact temperature of the air, the precise amount of moisture it contains, etc. For example, think of how many times on a cold, wintry day, one passes from the ill-ventilated, overheated indoor rooms to the fresh, cold, outside air, and the reverse; bearing in mind that each sudden transition of this nature catches the body unprepared and directly predisposes to the taking of cold. That these two evil influences may be obviated, it is important both that the least possible time be spent indoors (even at meal-time the stay should be cut to the minimum), and that the indoor rooms be thoroughly ventilated and maintained at proper temperature.

Practical Hints on Ventilation. The topic, temperature, will be discussed a little later; here it may be well to say a word or two on the subject of ventilation.

One of the simplest and most effective ways in which to secure adequate ventilation is by a cross current of air obtained through openings on opposite sides of the room. Even tho the patient is weak and the weather

cold, it will be helpful to secure a thorough change of air in this manner by opening wide the doors or windows at frequent intervals. A few moments will suffice to renew the air, and during this time an extra cover may be placed on the patient or a screen placed in position to shield him from direct draft.

When the windows are confined to one side of the room, one must perforce make the most of the situation by securing the best possible ventilation under the circumstances. In this case, the lower sash should be raised a few inches, for the entrance of the heavier, cooler, pure air; whereas the upper sash is dropt a like distance, for the exit of the warmer and lighter, foul air. In order that the window shade may not impede the exit of air through the upper opening, the shade should either be attached to the sash or fastened lower down on the casing than is customary.

Dr. Carrington, in his excellent and profusely illustrated book on fresh air, written for home use,* has suggested that the shade be attached to the roller by several pieces of tape of convenient length, or by a piece of strong coarse mosquito netting; pointing out that if the netting is the same color as the shade, the device is hardly noticeable. The shade should be shortened sufficiently so that when drawn down to its full length in order to expose the upper opening, a clear path will also be left for the entrance of air below it.

During bitterly cold weather, a wooden strip, secured to the lower end of the window casing, is useful in shielding the occupants of the room from a direct draft, while leaving an entrance way for air between it and the lower sash.

NOTE: It goes without saying that these are all

* "Fresh Air and How to Use It," by Thomas Spees Carrington, M. D., published by the National Tuberculosis Association, 370 Seventh Ave., New York.

merely cold-weather suggestions. In the warm season, of course, the aim should be to throw wide all doors and windows so far as can be done and at the same time keep the temperature within healthful bounds. During hot weather and in tropical countries, in order to keep the rooms reasonably cool, it may be necessary to close most of the openings while the sun is high, but as soon as feasible they should be opened wide. Latticed curtains of the Venetian-blind type and Japanese matting curtains are very practicable for keeping out the intense sunlight, while permitting ingress and egress of air.

On hot, sultry, still days an electric fan is a very helpful device, and will yield large returns, both in relief and actual benefit, for the amount invested, provided care is used to avoid taking cold. The fan should not be too near the person, nor its speed excessive.

The Sleeping Quarters

If practicable, the sick person should occupy a separate room; at all events he should sleep in a separate bed, which should be at least four feet distant from that occupied by another person. A room with screened openings on three sides equipped with suitable curtains, one or more of which may be lowered when desired; with an alcove off the fourth side, which may be heated for dressing, is very convenient. If the choice is limited, a room with a maximum number of windows and a southern exposure should be selected as a rule. Those who from necessity must make use of a room with only one window, should sleep with the head of the bed near the window, which should ordinarily be wide open. If the patient be very weak or the weather decidedly cold, it may be desirable to use a window tent, which may be purchased at small cost, for obtaining ventilation without undue exposure.

The furnishings of the room should be simple and easily removed and cleaned. When not in use the sleeping quarters should be flooded with sunshine. When occupied the amount of sunlight admitted should be governed by the peculiar needs of each individual.

In cold climates, a room with wide French windows opening on a balcony is an excellent arrangement. Bed patients may spend the day on the balcony, and if the weather is extremely disagreeable, the bed may be rolled indoors at night. The night quarters should also be thoroughly ventilated.

The Method and Your Means. For those of limited circumstances, a lean-to or a shack may be erected upon the roof of the dwelling or apartment; or, with a little thought one can devise appropriate means for providing shelter upon some porch or balcony. With merely these simple and meager appurtenances, many a person with slender means has won his way back to health.

Tents and Tent Houses. In other cases, a tent or a tent house may be utilized. In order that drainage be thorough, the domicile should preferably be situated at a slight elevation. The ordinary tent does not afford sufficient ventilation and moreover, is abominably hot in the summer, and uncomfortably cold during the winter.

A wall tent may be improved considerably by converting it into a tent house. For this purpose, a floor placed well above the ground, on which wooden walls two and a half or three feet high are constructed, together form the ground- or frame-work upon which the tent is set. A canvas fly suspended a foot above the tent is of great advantage. The walls and ends should be capable of being rolled up or opened wide, to permit free circulation of the air. A large opening cut in the center of the roof of the tent proper, to allow easy exit

of the air, is a feature of great value. Flies and insects may be kept out fairly well by the liberal use of mosquito netting. A canvas roof extended out in front of the tent, under which, if permissible, one may sit or recline during the day, is an inexpensive but very useful addition.

How to Construct an Individual Bungalow at Reasonable Cost. An individual bungalow, like those in use in many sanatoria, which can be built at moderate outlay, makes a very satisfactory abode for some patients. A bungalow of this type consists essentially of three parts: a small veranda in front; a middle room for ordinary use, with side walls two and one-half or three feet high on three sides, above which are large screened openings, equipped with curtains that may be manipulated from within; and a smaller room in the rear for dressing, supplied with a clothes closet and, preferably, with a sanitary wash bowl and a toilet and bath. Additional smaller screened openings of perhaps a foot in width, located just beneath the eaves, and other openings in a cupola in the roof (to provide for ingress and egress of the air in case very stormy weather makes necessary the lowering of all the curtains), are valuable additions. Such a bungalow may be erected for from two to five hundred dollars, depending upon the size, details and equipment.

In building the bungalow, there are two or three apparently inconsequential points, but which if given attention will mean much for the comfort and peace of mind of the occupant. (1) Care should be taken to make sure that the curtains or devices of whatever nature provided for closing the screened openings, are so constructed as to prevent the rubbing, flapping or banging of the canvas against the metal screens during windy weather. At night all noises are magnified; so at this





CONTRASTING CURTAIN TYPES

Above, a sleeping porch equipped with closing devices which may be swung outward. The advantages are that ventilation is provided for even while the rain and the sun (if undesired) are excluded. The lower photo shows the sliding type of curtain. A more simplified system of ropes and *pulleys are used for* curtains of this type, and they hold their *alinement better and retain* a pleasing appearance longer.



time, particularly, lack of foresight in this direction may prove very annoying and distressful to sensitive persons. Perhaps the most practical and simplest way of avoiding the difficulty is to have the metal screens placed on the inside instead of the outside of the wooden framework; taking the precaution, also, to leave a space of two inches between the wooden upright supports (inserted for strength at one or more places in the length of the openings, and which divide the screening into several panels) and the canvas curtains, when tightly closed. Even if the canvas flaps are firmly fastened to wooden frames, the precaution is still necessary; for no matter how tight the canvas is stretched, it will in all likelihood soon loosen and may become a source of much annoyance, if not separated from the screen by a sufficient distance.

(2) If curtains capable of being swung outward are used, the ropes for manipulating the curtains should be fastened to the curtains or curtain frames in such a manner as to prevent the rain from running down the ropes, thence through the holes piercing the walls of the bungalow, through which the ropes slide, and onto the floor.

(3) It is an advantage to use some type of curtain that may be swung outward at an angle to admit the fresh air and yet keep out the sun and rain, but which, when desired, may also be opened in such a manner as to flood the interior with sunshine.

(4) In hot climates, a double roof will serve to render the air inside the bungalow cooler and more comfortable.

In Dr. Carrington's book on fresh air (previously mentioned), may be found many other helpful suggestions concerning outdoor living and sleeping quarters of many types, with plans and illustrations.

Bodily Warmth and Resistance to Disease

Elsewhere in these lessons it has been explained that neither extreme heat nor extreme cold is suitable for the sufferer from tuberculosis. However, the general rule may be formulated that the more cold one can become accustomed to withstand without ill effect, the greater the benefit. **There is no question that a great many persons love heat too well for the good of their health.**

How many there are whose living rooms are kept above brood-oven temperature, who at the first sign of fall or winter begin to hug the fire, and who at all seasons over-burden their bodies with heavy wearing apparel during the day, and are inclined to weight themselves down with multiplied layers of bed clothing at night! It is of course highly important that one take all necessary precautions for securing adequate protection against the elements; on the other hand it is not only useless but is definitely hurtful for one to live in a superheated atmosphere or to swathe the body in too heavy covering. It is self-evident that the needs of no two individuals are exactly the same; yet one should let sink into the memory the fact that each degree of heat added to the temperature of the living or sleeping quarters, each extra blanket that is used and each extra article of clothing that is worn, above the actual requirements, rob one of just that much resistance, delaying by a corresponding length of time the acquirement of that general toughness and hardening—that general ruggedness and vigor—which is so much desired.

Long habit has in many persons produced so deeply ingrained and so intemperate a longing for heat, that it is ofttimes necessary to discipline one's desire in this regard. With practise it is surprising how little warmth

one may accustom oneself to get along with, with increasing benefit. One should seek the least amount of heat that gives *reasonable,* but not *luxurious,* warmth and comfort.

Temperatures Recommended. As to the actual temperatures recommendable, it is impossible to make a rigid rule. A room that seems just warm enough to one person may feel intolerably hot to another, and too cool for a third. For this reason, let it be understood that the following temperatures are given only as suitable for the average patient, and that in the given case some modification up or down the scale may be called for. Under ordinary circumstances I would recommend 60° to 65° F. for the sitting room or study; **even in exceptional cases it is seldom advisable for the temperature to be raised above 70° F.** For the workroom, 60° F. or less, is usually sufficient. If it were possible to keep the mercury in the sleeping quarters as low as 60° F. at all times this would prove best for the great majority of persons. Needless to add, **it is often an advantage to have the temperature of the sleeping apartment considerably below this point.**

In deciding on the exact temperature that is best, one must fall back on the ancient test of common judgment. Manifestly, one should never allow oneself to become so cold as to actually suffer harm; at the same time, if one has been wont to pamper oneself in the use of heat, one cannot expect to continue to do so.

Some Moisture in the Air Desirable. Before leaving the subject of temperature there is one point that deserves emphasis. Certain patients hold firmly to the conviction that no moisture in the air is desirable. These persons are not only mistaken, but if they attempt to put their belief into practise, are in danger of doing themselves direct harm. It is therefore necessary to lay

stress on the fact that neither air that is highly saturated with moisture, nor air that is extremely dry, is conducive to the highest state of health and happiness. What is wanted is neither the withering, intensely dry heat of the blast furnace, nor the wilting, steaming, oppressive air of the hothouse. Here, as elsewhere, the happy medium should be sought. When the air is exceedingly dry, drafts are felt more keenly, and one is inclined to chill more readily than if the air were reasonably moist. So, too, extremely dry air not only produces feelings of fulness and discomfort in the nose and throat, but actually smooths the path for the development of colds, catarrh and tuberculosis.

For the temperatures mentioned, the aim should be to have the humidity somewhere between 40 and 70 per cent, the exact percentage varying according to the requirements of the individual case. *Important:* This degree of humidity is to be looked upon as correct only so long as the temperature remains within reasonable or moderate bounds. In other words, with either a very high or a very low temperature, even this much humidity is undesirable.

Persons who have heretofore found that the room temperatures mentioned above produce chilling, would do well to investigate the relative amount of humidity present. Often this will be found as low as 30 per cent. If the requisite amount of moisture be added, to one's surprize the same temperature will now be found quite comfortable and agreeable, as well as more healthful. The consideration of the means whereby the atmosphere may be properly moistened, naturally leads to the question of—

Methods for Supplying Heat and Light. In all cold climates, some provision must be made for furnishing heat to the living quarters when necessary. For

this purpose, wood, coal, steam, hot-water or hot-air heating systems are all fairly satisfactory, or may be made so.

Some of the ordinary heating devices have a pronounced tendency to exhaust the watery vapor from the air, thereby rendering it extraordinarily dry and unhealthful, as just explained. On the other hand, many of the more up-to-date heating systems are equipped with some form of air-moistening device. One should make sure that the moistening apparatus is in proper working order and that it is kept at all times supplied with water. If the heating system of the home lacks the air-moistening equipment, separate air-humidifiers for attaching to the radiators or elsewhere may be purchased. Or, the same need may be filled by simply placing pans of water on the radiators or stoves for evaporation.

As previously noted, gas stoves when not properly vented, and coal-oil stoves, saturate the air with poisonous fumes, and are for this reason preferably banned. As sources of light, for a similar reason, electricity is safer than illuminating gas. There is no great objection to coal-oil lamps.

How to Sleep Out of Doors with Comfort and Benefit

The bed should be so situated in the room as to afford the sleeper shelter from violence of the elements. In keeping with this purpose, light canvas screens are in many cases very useful adjuncts. When the wind is strong, one or more of these screens may be put in place where most needed at the time, thus rendering efficient service in breaking the force of the wind without at the same time materially cutting off the supply of fresh air.

During the winter, a thick mattress, overlaid by several layers of heavy paper or a bed pad, or two mattresses with the paper pad between them, will effectively bar one important pathway of the cold. An arrangement of the pillows in the form of an inverted V will help to secure protection for the shoulders. If necessary, the bed may be warmed with hot-water bags, by jugs or bottles filled with hot water, by hot bricks, hot sand bags or stove lids, or by an electric heating pad or some similar contrivance. If the invalid recalls what has just been said as to the advantage of hardening himself as much as possible to cold, he will understand that these devices should be used as little as practicable. If the weather is bitterly cold, it is well for the patient to get into his bed (which has previously been warmed by hot-water bags or the like) while in a warm room and then be rolled outside. The method of tucking in all except the top-most cover under the bed pad, after which the top cover is folded under the mattress, affords perhaps the most satisfactory method of preventing the covers from sliding off.

Sleeping bags, knitted hoods that cover all the head except the face, or other head covering (nothing should be used that covers the nostrils), nose protectors, made by fastening a piece of cotton across the bridge of the nose with adhesive plaster; and bed slippers—all are useful in securing protection from the piercing cold.

A little care given to anointing the face with cold cream or a similar preparation, for the purpose of preventing chapping, does a great deal toward making sensitive patients feel at ease—thus promoting relaxation and aiding rest.

Outdoor sleepers who are troubled with the moonlight or the glare of the sun, may ofttimes find much comfort and help by wearing a black band over the eyes.

Hints on Clothing

All wearing apparel should be loose; tightly laced corsets should not be worn. For underwear, a light linen mesh fabric or other porous cloth that readily absorbs moisture from the skin and dries out quickly, should be selected for use during the summer months. Silk is also very satisfactory. Unless some extraordinary and valid contrary circumstance prevail, the wearing of heavy woolen underwear during hot weather is not only a hardship but is positively objectionable. For the outer clothing, some light colored, light weight goods such as Palm Beach Cloth, is comfortable at this time.

As seasons follow one another, the change from light to heavy clothing and *vice versa,* should be made with caution.

During fall and winter, linen, light or heavy cotton, wool or half-wool, are appropriate, according to the requirements and custom of each person. Two or more pairs of high woolen socks or stockings, may often be worn to advantage on very cold days; if desired, a pair of cotton stockings may be worn next to the skin. Overcoats with high collars, caps that cover the head and ears, ear protectors, boots, leggins, gloves or mittens and wristlets—all have their virtues and should be worn as occasion demands. House slippers and bath robes should be placed near at hand at night, so that they may be donned immediately on slipping out of bed.

If the feet are kept warm at all times, this contributes greatly to the feeling of warmth and general well being. When sitting up in cold weather, one or more steamer rugs or blankets should be placed on the chair and allowed to extend a short distance onto the floor, or even better, placed over a footstool or foot support of some kind. The patient then seats himself and the

blankets are carefully drawn around him and tucked in.

A garment of unusual merit for out-of-door sitting is the so-called "Sitting Out Bag." Planned with the idea of giving effective protection from the cold with maximum comfort and convenience, the Sitting Out Bag has a lower portion made into a large roomy envelop for the lower limbs, while the upper part is designed to form a loose, comfortable covering for the body, shoulders and upper extremities. Free movement of the arms is provided for. Sitting Out Bags may be purchased in various sizes at a fair price from several firms, the Kenwood Bag, made of delightfully warm material, but which is not "weighty" or bunglesome, being an especially good one.

On rainy days, those who are abroad should see that the body is well guarded against wet and damp, by wearing some form of mackintosh or raincoat, by enveloping the feet in snug rubbers or rubber boots, and by carrying an umbrella, if deemed advisable. The sou'wester is a simple yet very effective shield for the head and neck. If through oversight or accident the clothing or person should become wet, on no account should one fail at once to put on dry garments.

Other helpful hints on outdoor living may be found in the pamphlet entitled, "Sleeping and Sitting in the Open Air," sent free on request by the National Tuberculosis Association, 370 Seventh Avenue, New York, and in Dr. Carrington's excellent book already referred to on several occasions, obtainable from the same source.

Why Indoor and Outdoor Crowds Should Be Avoided

Apostles of the fresh-air life whose condition permits them to be up and around, quite naturally seek diversions of some sort to pass the time. The general ten-

dency is to seek amusement and companionship. Thus, one is often led to attend auto races, theaters, moving pictures, etc. It seems necessary to emphasize, therefore, that these things, especially the indoor pastimes, threaten the success of the whole undertaking. In crowds are nearly always found one or more persons with fresh colds, tonsilitis, or the like; from whom may be acquired the very thing that it is highly important to keep clear of—that is to say, a "mixed infection." (For further light on mixed infection see Lesson IV.) Congregations of people *out of doors*, stir up dust, dirt and germs, which is bad enough. Indoors, the conditions are worse. In a crowded room, no matter how thorough the system of ventilation, the air can never be as fresh and pure as outdoor air. Moreover, those who mingle indiscriminately in indoor assemblages, have their protective forces depleted at the very time that they are subjected to the chance of acquiring a large dose of fresh, and therefore probably highly virulent, germs. For this reason **indoor crowds are to be shunned at all times.**

Is Sunlight Valuable and What Is Its Effect?

In the rays of the sun, Nature has bestowed another blessing upon the sick. In no disease does the advent of a bright sunny day show so quickly on the patient as in tuberculosis. "Blues" give way to a more "rosy" view, and this brighter outlook in turn causes a change for the better in the disease. This cheering influence is one of the most important effects of sunlight, but the solar rays also have other beneficial qualities. Besides being a most trustworthy disinfectant of the air, sunlight is a valuable general tonic and blood builder, and is an able ally of fresh air in hardening the individual and in stimulating his defensive powers, thus indirectly "boosting" *him toward success.*

In order to obtain benefit from the sun, it is not always necessary nor even wise for the body to be exposed directly to its rays; altho in many cases direct exposure is a decided advantage. Heat from the sun is desirable only in limited amount; for it is the cold rays, including the ultra-violet, to which its beneficent effect is principally due. The rays penetrate the chest and reach the lung directly only in small amount, but are absorbed by the blood circulating in the skin, and carried to the innermost recesses of the body, including the lungs, where their influence for good is manifested by an invigoration of the body cells generally, by a stimulation of the healing processes of Nature, and, to a certain extent, by a destructive or germicidal action on the germs in the lungs.

Rules for Taking the Sun Bath. At the outset, it is necessary to make clear that the same care and judgment must be used in determining whether or not one's case is suitable for the direct sun treatment, and in regulating the dosage of the sun's rays, that would be used in administering any powerful medicine.

Cases Suitable. In general, the sun treatment is suitable for those patients who are able to be up, but if used with especial discretion, it may also be applied with benefit to many who are confined to bed. Except on the advice of the physician in charge, the treatment should not be taken by persons who have at *any time* had *severe* hemorrhages, nor by those who have *recently* shown even a *trace* of color. Moreover, it should not be taken when severe chest pains are present, when the pulse is above 100 while the patient is at rest, when the fever is above 99.5° F., nor when any evidences indicating that the disease is gaining rapid headway are noted, nor when complications occur.

Sun baths are as a rule not advisable for anyone who *has* ever suffered a sunstroke.

Method. The sun's rays are to be applied very gradually; and a cool period in the weather or at least a comparatively cool part of the day should be selected for making the start. The top of the head should at all times be kept covered, and the eyes shaded by colored glasses if the light is very bright. The bath is taken with the patient reclining in the open, without the intervention of glass windows.

A good method is to begin with a five-minute bath, with the *feet* only exposed to the direct rays of the sun while the rest of the body is kept covered or shaded. The effect should be carefully watched. If all goes well, the length of the succeeding baths may be increased five minutes daily; also exposing each day a greater and greater surface area of the body. For example, the second day the feet are exposed ten minutes, and the legs from ankles to knees five minutes; the third day the feet are exposed fifteen minutes, the legs from ankles to knees ten minutes, and the thighs five minutes; the fourth day, five minutes is added to the time allowance for each of the previously exposed parts, and the abdomen is exposed five minutes; the fifth day again the time allowance for each of the previously exposed parts is increased five minutes, and the chest is exposed five minutes. From the sixth day onward, after taking the bath as just described for the fifth day, if the patient's condition permits, he turns on his abdomen and, beginning again with the feet, a similar course in applying the treatment to the back is included in the daily program. Thenceforward, by a similar process, day by day the exposure of the whole body is gradually evened up. When this is accomplished, full exposure may be made each day from the beginning of the bath.

Severe sunburn should be avoided, but to a greater or less degree a gradual tanning is both inevitable and desirable.

Safeguards. Weakness following the treatment; noteworthy increase in the pulse rate that does not fall within one-half hour; a *persistent slight* increase in the temperature, or a *great* elevation for even a *short* time; the development of chest pains; a marked increase of the cough and expectoration traceable with reasonable certainty to the sun bath—any of these symptoms call for a more guarded application of the treatment, and in some cases for its abandonment. If even a tinge of blood appears in the sputum no further baths should be taken until the sputum has been clear for several days—and a longer interval should be allowed if the amount of blood has been larger. At all events, if any of these untoward symptoms arise the increase should be less rapid; and it may even be necessary to make no increase, to shorten the seance, or to stop the treatment entirely, either temporarily or permanently. If the bath be omitted for one or more days, when resumed the duration or the area exposed, or both, should be correspondingly reduced.

The Maximum Duration of the Bath. Altho longer periods are sometimes advantageous, unless the treatment be supervised by a competent physician it is as a rule unwise for those patients having even slight fever to prolong the bath beyond one hour, and for those without fever, beyond two hours. If things go smoothly, two baths daily, separated by an interval of a few hours, may be taken later.

It should be emphasized that simple as this program may seem, **faulty application of the solar rays may do much harm.** Remember that the object is not primarily a bath of long duration. **The aim should be to ascertain the length of bath that best meets one's own requirements and to lie in the sun for this period, and no longer. Haste has no part in the plan.**

and it is in all cases advisable to do too little rather than too much. In climates where sunstroke is common, all precautions should be redoubled. If the length of the bath be cut to suit the measure of each person, many will never reach the limit of exposure set down above.

It should never be forgotten that the sun is a two-edged sword capable of doing good or harm, according to the way in which it is applied. When in doubt, do not take the treatment.

If these rules be adhered to, one will usually be more than pleased with the results. In many instances there takes place such a remarkable building-up of the resisting power, that one is able to stand complete exposure (except the head) on very cold and even wintry days.

Other Suggestions and Remarks. Applied in this manner, the sun treatment can satisfactorily be taken at home, if occasion requires. Suitable canvas strips or screens for securing protection from the wind and the curious, can be provided at small cost, making it easy for one to make effective use of the method, either on the roof or a balcony, or in the back yard. In the event that complete exposure of the person is undesirable or inconvenient, if the chest alone is exposed, this is often of considerable benefit. *Caution:* If the exposure of the chest is not preceded by exposure of the lower parts of the body, even greater care should be used, and it will be safest not to exceed two and a half minutes in the daily increase of the time allowance.

Two useful outgrowths of the sun treatment are the artificial light treatment (discussed in Lesson XV) and an ingenious device, called the Solar Laryngoscope, for reflecting condensed sunlight into the throat, which has proven of marked benefit in tuberculosis of the larnyx or voice-box.

LESSON XII

THE TRUTH ABOUT CLIMATE

The Fetish of Climate Worship. That climate is an important agency in the fight against tuberculosis, is undoubted. Yet it is equally true that each year thousands lose their lives solely because of an almost superstitious faith in climate as a sort of magic talisman. This supreme faith is unwarranted. It is very unfortunate that many who on no account should be moved, some in very weakened condition indeed, are still being sent on long journeys to lands where climate supposedly holds mysterious and miraculous sway over tuberculosis.

Having reached their destination, how many there are who fall a prey to lonesomeness and homesickness, who suffer from the lack of proper food and other privations and exposure; or who follow the alternative of taking up work when wholly unfitted to do so—in the end to perish in misery and wretchedness from one or more of these causes!

Climatic Pessimism. Directly contrasted with the extravagant laudation of climate, stands the opinion of another group of individuals who have become climatic pessimists. Basing their reasoning on cases wherein climate has failed to achieve all that has been expected of it, these persons are convinced that climate is practically worthless as an aid to recovery.

Climate and Common Sense

After listening to the arguments pro and con in regard to climate advanced by his friends, the sufferer is

often bewildered, and wholly at loss as to what to believe. In searching for the solution of the problem does it not seem logical to submit the case to the tribunal of common knowledge and experience? In the first place, everyone is aware of the remarkable differences in the physical prowess and temperamental attributes of the various races inhabiting the globe. Who, for example, is not familiar with the sharp contrast between the energy and activity displayed by the people who inhabit temperate zones and the lethargic tendencies of those living in tropical climates!—distinctive differences which it is quite generally agreed are due at least partly to the influence of climate.

Second, getting down to your own experiences: Have you not, perhaps, at some time during life on taking up your residence in a new climate, noticed that you were pleasantly stimulated; or, on the contrary, found that you were weakened and depressed? Now, if it is borne in mind that these effects of climate, for good or bad, are noticed by those who are entirely well, is it not reasonable to suppose that climate will have a similar influence on the sick, modifying in one direction or the other their ability to resist disease?

The offhand answer is Yes; and as a matter of fact, careful study of innumerable cases of tuberculosis by expert physicians in all parts of the world, has established the correctness of this answer, proving beyond a doubt that climate has definite value against tuberculosis.

Proof for Skeptics. Those who have little or no faith in climate, may perhaps convince themselves by examining with unprejudiced minds the stories of others who, after making a fair test of all other means for reclaiming health, without benefit, through making a change of climate have finally won the coveted prize.

True, in a large number of such instances, other factors inevitably associated with the move to the new climate must be given credit for boosting the patient along the route to health. Thus, the mere change of residence, as from the city to the country, or from the harmful influences that held sway in the old environment to the more peaceful and restful surroundings elsewhere; or again, the difference between a confining occupation indoors and the free life in the open—singly or combined—these influences have sufficed to renew the grip of the sufferer on life and happiness. In other instances, the inspiration of high hope or strong faith has served to cause a favorable turn in the tide. In yet another group of cases, time has been the determining element; the disease running its course of ups and downs until the fire finally burned itself out and convalescence ensued. There is no doubt, then, that many who attributed their regeneration wholly or principally to climate, would have recovered just as assuredly, altho perhaps not so rapidly, in any climate. In these cases it was the new surroundings, or *changed conditions* of some sort, that were really responsible for the turn of fortune.

What of Those Who Have "Come Back" After Exhausting Other Measures? None the less, if a painstaking examination is made into the details of each case in which climate has been given the credit for recovery, after all the chaff is sifted out there remains a certain number of instances in which, one by one, other influences may be cast aside, until only the factors of time and climate remain. Cases have occurred in which the patient had previously broken away from the ties of home and the hindering influences of the large city, and had moved to a suitable place in the country—without, however, changing climates. Here he had

"taken the cure" faithfully—only to continue going steadily downward. As a last resort, his funds nearly exhausted, with only a railway ticket and a few dollars in his pocket, he was lifted aboard a train and started upon a journey for better or for worse. Later, lonesome and heartsick, without faith in climate, hopeless, yearning to experience the relief of death, he was assisted from the train at some isolated spot. Now chiefly dependent upon his own efforts, he was perhaps even forced to spur his feeble body to put forth its fast flickering strength to obtain the bare necessities of life.

Time passed. The invalid was surprized to find himself still alive, to learn that he was even taking a new interest in things, and that his body was day by day growing stronger. A little later, he was overjoyed to discover that the improvement was continuing—until at last, despite the violation of all rules and regulations and the suffering of many privations, hardships and exposure, there slowly crept into his mind the realization that he had won!

Some skeptical persons may assert that even in such cases time was the determining factor, and claim that had the individual continued to "take the cure" in the original climate, the disease would have run its course and recovery have ensued just as certainly. Cases have occurred, however, in which the inroads of the disease were so extensive and its progress so rapid, that it seems unreasonable to attribute the turn of the tide to anything else than climate. Altho not common, yet in the aggregate a considerable number of such cases have occurred.*

* Such incidents furnish striking proof of the beneficent effect of climate, but it should be distinctly understood, nevertheless, that it is a serious mistake to change climates when this entails a sacrifice in more important health items. For example, ninety-nine times out of a hundred the course followed in the case just cited would have the very opposite effect and only hasten the unfavorable outcome.

Climate Valuable but Not a Magician's Wand. Trials of climates of all varieties in innumerable cases, have proven conclusively that while climate is not by any means a sure cure, it is a remedy of considerable value. Alone, climate will accomplish little; yet in conjunction with other health measures, if administered with discernment in appropriate cases, it is equally certain that the proper climatic medicine will often increase the chances of success sufficiently to turn the scale from defeat to victory.

Who Should Seek a Change of Climate?

As the outcome of even the mildest case is not certain in advance, every patient will do well to take advantage of the benefit that climate offers, *unless there be some bar to its use in his own case.* Before definitely deciding whether or not he will seek benefit from climate, it is important, therefore, to ascertain whether, all things considered, the change will prove profitable.

QUESTIONS FOR CAREFUL THOUGHT

1. Is the Sick Person Strong Enough to Stand the Strain of the Trip; or, Is There Any Other Factor That Would Unduly Increase the Risk of Moving? First of all, let it be clearly understood that it is ordinarily both foolish and cruel to send away a patient who is in a very late stage of the disease and so manifestly ill that there is serious doubt as to whether he will survive the journey; who, if fortunate enough to reach his new place of residence without mishap, will perhaps spend his last days in want and privation, far from friends and home. As a general rule, then, it is inadvisable for one who is extremely weak, who has a very high fever, or shows in other ways that he is exceedingly sick, to travel any great distance.

The chances of a hemorrhage occurring should be also carefully appraised—not forgetting that the danger is increased if a hemorrhage has taken place only a short time previously, or if even a trace of color has been raised very recently.

True, some whose condition seemed absolutely hopeless and who at the outset were in extreme exhaustion, have withstood a long, wearisome journey surprizingly well, and have obtained benefit from the change—ultimately winning complete victory. For this reason, no hard and fast rule can be made. Other factors, such as the length of the journey, the mode of conveyance, the ease with which the sick person can accommodate himself to the conditions of travel (that is, his ability to relax and rest while on the way), and the extent to which steps for promoting his comfort can be applied—these and other influences should be given careful consideration, letting the final decision rest on the sum-total of the merits of each case.

2. Has the Health Seeker Sufficient Means, Both to Pay for the Trip and to Support Himself Properly While Recovering? Bear in mind that he whose pocketbook would allow only a brief visit at a health resort, in all probability will make the most of his opportunities by remaining in his home climate, where his limited means will maintain him for a longer period. In this connection, it should be explained, also, that even in the mildest case it is unlikely that the invalid will be in condition to take up even easy work before months have elapsed. Moreover, it is often more difficult to find suitable light work in a health resort than elsewhere. Those who must pare their expenses closely should not forget that climate can be spared much more readily than other items of the treatment. Above all, avoid skimping on the elements of *rest*, *food* and *time*.

3. What Will Be the Influence of the Patient's Temperament on the Outcome? For example, if the invalid is to make the journey alone: Will the separation from family and friends overbalance the good effect of the new climate? Remembering that an environment congenial to the individual temperament is highly important, if not indispensable to success; and that homesickness alone has upset the plans of many a patient—the probable extent of the effect of homesickness in the given case should be estimated. Or, will the contrary influence prevail: will the freedom from the cares of the home, the severance of the old ties, and the complete removal from detrimental surroundings, be of immense benefit?

A Word of Explanation. Those who endeavor to carry out the program for recovery at home or in some ordinary locality, very commonly find that their friends, neighbors and even their dearest friends and relatives—probably well and hearty themselves—do not understand that tuberculosis is serious enough to demand faithful observance of the rest schedule and other health items. If the disease has been recognized while yet early (when it is probable that the patient *appears almost,* if not entirely, well) it is even harder for those who have not studied the matter to appreciate that care and treatment is required. Often the neighbors and friends fail entirely to sympathize with the sufferer in his efforts to reclaim his health, failing also to give him that encouragement and moral backing which means so much to the success of the undertaking. In such cases, the successful carrying out of the plan ofttimes becomes a very trying and difficult matter. For many, the remedy for this unfortunate state of affairs is the transferring of the residence to some place entirely away from old friends and relatives.

For a considerable number of patients, one of the numerous well conducted sanatoria will, no doubt, provide the right environment. (A general discussion of the advantages and disadvantages of sanatoria may be found in Lesson VII.) For others, however, such institutions are either unsuitable or, literally or figuratively, out of reach. When this is true, the fact that it is easy to do the right thing in a community where others are doing likewise, and where *on the whole* one's new friends are better informed regarding tuberculosis, constitutes a strong reason for seeking a change of climate. (This statement holds good only in regard to the more famous places where patients congregate in relatively large numbers.)

Caution. Altho, *on the average,* the residents of health resorts are fairly well informed on tuberculosis, the invalid is cautioned against intrusting himself to the guidance of his newly made acquaintances. In the new community he will find many who *think* themselves capable of giving advice on every phase of tuberculosis, but who, in fact, are only half informed, or even grossly ignorant, on the subject. Good advice will be mixed with bad, but as it will be difficult or impossible to determine when the one ceases and the other begins, by far the best plan is to secure a physician skilled in treating tuberculosis, and abide by his counsel. If this is impracticable, after reading carefully the preceding lessons, let each individual formulate a definite schedule suitable for his own needs, and thenceforward live up to it, regardless of what others may do or say. Remember that no two cases are exactly alike, and for this reason be on guard against taking up some unusual plan merely because it has proved successful in another case.

A Related Question. Here may come to mind the thought: "If I go to some new locality and there re-

cover my health, will I be able to content myself and arrange my affairs so that I will be able, if necessary, to settle down in the new spot for the remainder of my days?"

In answering this question, the following points should be borne in mind:—

1. In all likelihood it will be unnecessary to remain permanently in the new climate. However, it will probably prove advantageous to reside thereafter in some place having similar climatic characteristics.

2. The relapses that not infrequently follow the return to the old home, as a rule are not due entirely, or even mainly, to the change back to the original climate. They are usually due—chiefly, at least—to a reversion to the *old and faulty habits of living.*

3. With one exception, the chance that a fresh breakdown will result from the return to the original climate is less than the risk of failure, should one elect to remain in the old climate while "taking the cure." Stated differently, **one is more likely to fail to find health in the old climate than one is to lose it there, after having won it elsewhere.**

The exception referred to is this: When a pronounced change of altitude is involved in the transfer of residence, the problem is slightly tho not much more complicated. Suggestions for solving it will be given on a later page when considering the effect of altitude.

If Already in a Healthful Climate, Is a Change Advisable? It is sometimes said that a climate other than that in which the health has failed should be sought regardless of the fact that one may already be living in a healthful climate. As a matter of fact, however, the breakdown has occurred chiefly because of improper living or working conditions; not because the climate has been unsuitable. For this reason, if the campaign

for health is to be successful, a congenial and favorable environment is one of the all-essential requirements. If the proper environment cannot be obtained at home, it may be secured merely by leaving the city (or if already in the country, by moving to some new, tho not distant, locality), at the same time retaining the good that may be had from the climate.

In a word, if already living in any one of the better types of climate, unless there be reason for suspecting that this particular type of climate does not agree with one, the "cure" may well be taken in the home climate, *provided all other conditions are right.* If then, after a reasonable period of trial has elapsed, satisfactory progress is not noted, the change to a "good" climate of a different variety may prove beneficial.

The Effect of Climate

If full value is to be obtained from climate, it is important that one have some understanding both of the effect of climate in general, and of the relative advantages and disadvantages of each variety of climate.

Some Old Beliefs Exploded. Odd as it may seem, investigations made in late years have disclosed the fact that climate is worth little as a *direct* antidote to pulmonary troubles. Contrary to a one-time prevalent opinion, no climate has been found that has a direct destructive or germicidal effect upon the germs of tuberculosis, so long as they obtain refuge in the body. So, too, that climate is yet to be discovered which stimulates healing to any noteworthy degree through the *direct* action of the air upon the tuberculous lungs.

Climate a Builder of General Resistance. In what way then is the good effect of climate brought about? Briefly stated, the influence of climate is exerted more upon the individual than upon the disease; more upon

the body as a whole than upon the lungs. In the main, climate has the same influence upon those suffering from tuberculosis as upon well persons, but the effect upon the sick is likely to be more pronounced. If the type of climate is suited to the particular patient, the multitudinous cells of the body are day by day strengthened and invigorated and each organ thereby rendered more competent to fulfil its appointed task. Outwardly, this effect is shown by the progressive building up and hardening of the sick person. Coincidentally, the natural defensive forces of the body are strengthened more and more—all making for a larger and larger development of the resistance to, and the power to overcome, ills of many kinds, among which is tuberculosis.

Is Climate a Specific? As has just been shown, the chief effect of climate is not specific for tuberculosis; yet some evidence has been brought forth indicating that a certain element of climate increases—at least slightly—the resisting power against tuberculosis, more than against other diseases. Recent investigations have disclosed that in the bodies of persons residing at a high elevation there takes place a curious and interesting phenomenon which may have a direct bearing upon recovery. In such instances, an examination of the blood shows not only a general enrichment with red corpuscles, but reveals a special increase in that variety of white corpuscle known as the lymphocyte or lymph cell. Whether or not this increase in the number of lymphocytes is merely a compensatory change—a change that serves only to balance or offset some injurious effect of altitude—is unknown; but the fact that prior to this discovery many investigators had already reached the conclusion that the lymph cell plays an important rôle in the body's battle against tuberculosis, gives weight to the view that *altitude* has, to a limited extent, a specific influence against this malady.



AN ATTRACTIVE COMBINATION

The combination of sliding canvas screens and awnings shown here gives the advantages of both the sliding and swinging type of curtains.



A DOUBLE ROOF OVER THE SLEEPING PORCH

adds greatly to the comfort and wellbeing of the sick person in hot *climates.*

Caution: Remember, however, that the beneficial effect of altitude is in no case sufficient to warrant one in entirely disregarding its drawbacks (to be mentioned later). Only through a careful consideration of each feature of the particular climate under consideration, followed by a decision based upon the climatic picture as a whole, will the full reward from climatic change be reaped.

The Local Effect of Climate

It is quite common to hear some one say of air that contains very little moisture, that such air "dries up the disease in the lungs." While this statement is not literally correct, yet if interpreted merely as meaning that through its local effect, dry air favors healing, it expresses the gist of the matter fairly well.

Dry Air Lessens the Risk of Complicating Infections. Dry air as a rule contains relatively few germs. If this fact be coupled with the well-known observation that germs grow best in the presence of moisture, there is seen to be good ground for the presumption that the inhaling of drier air would not only render the lung soil relatively unfit for the seeds of tuberculosis, but would reduce the chance of adding more seeds to those already in the lungs. Similarly, the chance of acquiring "colds," or of having a secondary infection (infection with germs other than the tubercle bacilli—see "Mixed Infection," Lesson IV) engrafted on the lungs, would be minimized. What is more important: This theory has been upheld and confirmed by the multiplied teachings of experience; for the observation that "colds" and other infections are less frequent where the air is comparatively dry, has become commonplace.

It is also well recognized that dry air has a tendency to reduce the quantity of the sputum. True, the de-

crease brought about in this manner does not signify that the destructive process in the lungs has abated correspondingly; for it is mainly the watery constituent of the expectoration that is reduced. Less moisture being inspired in the air, it is natural for less water to be eliminated in the sputum. Likewise, when the air is dry, so much water passes from the body in the form of sweat (visible or invisible) that very little water remains to be disposed of in the sputum. None the less, the effect is valuable, and, after all, the mere fact that the sputum is reduced in amount makes it probable that less effort will be required to raise it. Thus, the cough is cut down, the lungs are kept comparatively quiet, and Nature's delicate fibrils of healing tissue protected.

Note: The effect of dry air is less important in the "closed" case—that is, before softening of the tubercles has occurred and the resulting semi-liquid material has been discharged into the bronchial passages (discussed more extensively in Lesson IV). Yet even in this type of case, through its influence on the *body as a whole* dry air may be of considerable benefit. This effect will be more fully explained in a moment.

Drawbacks of Dry Air. Mistakenly assuming that dry air has good qualities only, some pursue the search for a drier and drier atmosphere, regardless of its possible ill effects. Sometimes, too, this quest for an ultra-dry atmosphere is carried out at the expense of highly important items in the health regimen. Do not forget, then, that dry air has bad as well as good points.

Among its disadvantages, dry air is not rarely accompanied by a peculiar electrical atmospheric influence. This has a tendency to make some patients quite nervous and restless and to cause sleeplessness—all of which interferes to a greater or less degree with the rest program. Again, extremely dry air has a tendency to cause a stuffi-

ness in the head, and an annoying, uncomfortable feeling in the throat—both of which are disagreeable, to say the least. For patients suffering from tuberculosis of the larynx, to whose sensitive throats dry air is apt to be especially irritating, a change to a moister atmosphere is sometimes helpful.

The Moist-Air Bugaboo. It is to be regretted that there are many who take so exaggerated a view of the dangers of moisture that whenever a cloudy or rainy day occurs they live in a state of continual dread until the sky clears again. Such persons are prone to brood over the matter and to bemoan their fate, perhaps saying that if the fog or clouds do not soon melt away, they will lose their chances altogether. They may even work themselves into so excited a state as to anticipate ill effects from the weather; and are continually hawking and spitting—perhaps forcing themselves to cough. If the truth were known, the increase in their symptoms on such occasions is half imaginary; the forced efforts to clear out the breathing passages serving only to provoke irritation and to "start something." If the invalid will only make up his mind that perfect conditions are unobtainable, and resign himself to accept cheerfully and gracefully the normal ups and downs of the weather, he will very likely find that the terrible ogre of moisture is largely a fabric of his own fancy.

First and last, if he who wishes to make the most of his opportunities will impress upon himself the fact that recoveries take place in all climates, and that dry air, too, has its limitations, he will be less likely to fall into the common error of making his slogan "A dry climate, the drier the better," when perhaps a relatively moist atmosphere would be better for him.

(In the preceding lesson, both sides of the moist air question are presented from a different angle, so if the

effects of moisture and dry air are not entirely clear, it may be helpful to refer to the previous lesson now.)

The Attributes of a Healthful Climate

Years ago, oxygen and ozone (the latter especially) were credited with marvelous powers over tuberculosis, the percentage of oxygen or ozone in the air being quite generally accepted as a reliable index to the value of a particular climate. Now, it is known that the influence of climate for good or bad turns almost entirely upon different factors. Moreover, it has been definitely established that in climates wherein a superabundance of ozone or oxygen was assumed to be present, frequently the air contains no more than an ordinary amount of these gases.

Primary and Secondary Characteristics of Climate. According to the modern understanding, the essential or *primary* requirements of a "good" climate are: (1) Purity of the air (that is, its relative freedom from dust and germs). (2) Moderate movement of the air (without, however, violent wind). (3) Abundant sunshine. All climates useful in tuberculosis have these attributes. In addition, in most cases, a rather wide variation between the night and day temperatures—say around 20 degrees—is desirable. For some, however, such diurnal changes are unsuitable (see below). At all events, it is important that the climate be on the whole fairly equable (that extreme weather changes be absent or infrequent) and that the factors of air temperature and moisture be kept within reasonable bounds.

The principal *secondary* characteristics of a favorable climate (that is to say, the characteristics upon which its exact type depends) are: (a) The elevation above sea level. (b) The temperature of the air. (c) The humidity (within the limits just mentioned). Aside

from these factors, the amount of electricity in the air has some influence upon the effect of the climate.

Stimulating versus Relaxing Climates

All climates may be classified broadly under two heads: (1) Stimulating or bracing climates. (2) Soothing or relaxing climates. Between these contrasting types, minor divisions, in which are included the mildly invigorating, and the moderately relaxing, climates, may be made.

A climate that is strongly stimulating acts like a powerful tonic to the entire body, giving strength and vigor to each of its organs. If the patient is to obtain benefit from this type of climate it is paramount that he be able to respond to the increased demand on his resources. If he is unable to meet this demand, harm rather than good will result. A climate of this variety calls upon each cell of the body for greater activity. If the case is suitable, the energy spent in this manner is not wasted, but is utilized in raising the resistance of the body against disease, to the maximum.

On the other hand, in other cases (cases unsuited to a stimulating climate) a relaxing climate brings about a similar end—in a different manner. Through the smaller demand that this type of climate makes upon the body, the output of energy is cut to the minimum. In this way the various cells of the body are given a comparative rest and afforded an opportunity to regain their customary strength, which is then utilized in concentration against the tuberculosis.

Other things being equal, cold, dry air is stimulating; a warm, moist atmosphere, relaxing. For the invalid who requires stimulation, the effect of a relaxing climate may be so decided as to produce weakness. For the patient whose reserve of energy is low (who needs a

relaxing climate), the greater demands imposed by a stimulating climate may so exhaust the energy that in this case, too, weakness results. Again, if the stimulating effect be very pronounced, the patient may be overstimulated and kept continually nervous and "on edge."

At high altitudes, a new factor, the lessened atmospheric pressure, contributes to the invigorating or stimulating effect. Then, too, the higher the elevation, the cooler and drier the air, as a rule. So at high altitudes the various influences combine to produce a very strong feeling of stimulation. On the contrary, at seacoast resorts, where the air is commonly surcharged with humidity and the pressure high, the general effect is one of relaxation, which is more marked, the higher the temperature.

On Fitting the Climate to Your Case. It is perfectly true that for most of us any other climate is preferable to the sweltering, almost unbearable heat of the tropics, or to the bitter, frigid cold of the arctic zones. So, too, almost any type of "good" climate furnishes more healthful conditions than do the cold, changeable, blustery winters, and the hot and sultry, enervating summers, of many of our eastern and middle-western states. Yet if the invalid is anxious to secure the maximum profit from his sojourn for health, he should choose the climate most nearly fitted to his own needs. If circumstances prevent the decision being left to an understanding physician, by bearing in mind the classification of climates as (1) stimulating and (2) relaxing—and by taking into account other factors to which attention will soon be called, the health seeker will be enabled to select that climate which, if not precisely best for him, will at least prove approximately correct. The following description of the several varieties of climates, and notation of the good and bad

points of each, with suggestions regarding the cases suitable in each instance, is designed to aid each one in solving his own problem.

STIMULATING CLIMATES

Characteristics. Moderate or more decided dryness of the air, low atmospheric pressure and relatively low temperature, are characteristic attributes of stimulating climates. At high altitudes—that is, at elevations between 3,000 and 7,000 feet (localities situated above 8,000 feet being unsuited to the treatment of tuberculosis)—where the air is usually cool or cold, as well as dry, the stimulating effect is very marked. Among the special advantages of high altitude should be mentioned the brilliancy of the sunshine and the abundance of the chemical rays of the sunlight. Coupled with the fact that here sunstroke is almost unknown, these qualities render the climate of high altitudes ideal for the carrying out of the sun treatment. (In the previous lesson may be found a discussion of the advantages of sunlight, with detailed instructions for taking the sun baths.)

This type of climate calls for strong reactive powers on the part of the sick person. Broadly speaking, it may be said that the more vigorous the patient, the greater the likelihood that a stimulating climate will prove best for him.

Cases Suitable. Cases of early and moderately advanced tuberculosis, barring complications and in the absence of factors having a contrary bearing, are as a class most suitable for treatment in stimulating climates, or at relatively high elevations. Patients in this group can usually be treated satisfactorily in any of the favorable types of climate, but probably will obtain the best results in a moderately or decidedly stimulating

climate. *Rule:* Other things being equal, the less extensive the disease, the more stimulating the climate, or, the higher the altitude (up to the limit mentioned above) that may be sought with safety.

Objectionable Features and Contraindications. Even very sick persons are at first oftentimes markedly exhilarated, and *apparently* quite invigorated, on moving to a high elevation. Unfortunately, however, in some of these cases the return of strength lasts only a short time. By putting forth all its energy even the very feeble body may temporarily force itself to meet the increased demand, but it is not unlikely that in the long run the strain will prove so severe as to bring on exhaustion. For very weak patients, therefore, I seldom recommend high altitudes. Nevertheless, even those in the far advanced stages of tuberculosis and who are extremely weak, *sometimes* succeed in avoiding the undesirable effects of altitude while securing all that it offers in the way of benefit. Thus, if more rest is taken than the case would otherwise require, the energy saved in this way may compensate for the heavier demands imposed by this type of climate.

Patients of advanced years, and less frequently other persons, not rarely find that the rather sudden and pronounced temperature changes at high altitude provoke a decided irritation of the respiratory passages. The cough is sometimes aggravated and the quantity of sputum increased, and other distressing or injurious effects produced. These effects should be given careful consideration, and it may or may not be that the impetus given toward recovery in other ways will outweigh these disadvantages.

Altitude versus Hemorrhage. A frequent question is: Should the patient who has at any time had a hemorrhage be moved to a high elevation? Formerly it



CURTAINS THAT ROLL AT THE BOTTOM

An extremely attractive open-air sleeping room, with an alluring sunparlor with French windows below. The striped canvas curtains are placed inside the screens.



A SCREENED-IN SUN DECK

Here is an inviting spot for taking the sun bath while flies and gnats are kept at a distance.



was supposed that the chances of hemorrhage were greatly increased at high altitude, but experience has proven that unless the elevation be extreme—above 8,000 feet—the risk is small, provided the proper precautions (which will be presently outlined) are taken. In this connection, the point to be remembered is that *the time of danger is almost exclusively while the change is being made, and for some days or weeks afterward.* During the period of transition from a low to a high elevation, or *vice versa,* the likelihood of hemorrhage occurring is somewhat increased, but after one has become thoroughly acclimated in the higher or lower altitude, as the case may be, the difference in the outlook for hemorrhage is not great. In general, the patient need not consider himself barred from high altitudes solely because a long time previously he has raised a few mouthfuls of blood. Those who have ever had a *large* hemorrhage should make the change with extreme caution, if at all.

Does Altitude Produce "Nervousness"? Again, patients fear that high altitudes will make them extremely nervous, or if they are already nervous, that this will be aggravated. The fact should not be lost sight of that here and there an individual is so overstimulated at a high elevation that very pronounced nervousness results; but this is exceptional. If it be recalled that slight nervousness is a common symptom of tuberculosis, it is evident that if everyone who is at all nervous is prohibited from living at a high elevation, the benefits of altitude would be restricted to a very few. On the whole, a moderate degree of nervousness alone is not to be looked upon as overruling a trial of high altitude, if for other reasons deemed advisable.

Will It Be Necessary for the Permanent Residence to Be Made at High Altitude? A frequent query is

this: If health is recovered at a high altitude, will it be necessary for one to live thereafter at a similar elevation? In most cases the answer is No. Nevertheless, now and then one comes across a person who, once accustomed to the rarefied air at a high altitude, has difficulty in making the change to a lower elevation. More rarely, it is found that it is altogether impossible to make the change down with safety, and that one is obliged to make one's home permanently at a high altitude. (This almost never occurs except in far-advanced cases or when serious complications on the part of the heart or other organs are present.)

Here it seems advisable to again accentuate a point that has already been mentioned. When disagreeable effects are experienced on returning to a lower elevation, the symptoms are not usually brought about by the change of altitude itself. They are usually due to the sudden resumption of work, or to the return to the old environment, which, with its many pulls and temptations, is so likely to drag one back into faulty habits and methods of living. If one will continue to live rightly, there is small chance that serious harm will result from the change to the lower altitude alone.*

At all events, the primary consideration is the complete restoration of health. From this standpoint, if in a given case the change to a higher altitude is warranted, only under extraordinary circumstances should one feel justified in holding back solely on the ground that some difficulty may perhaps later be encountered in becoming reacclimated at a lower elevation.

* Elements in the old climate other than the factor of elevation may, however, have a more important bearing on the question. To illustrate: Suppose one who has lived in the East recovers his health in some western state where both the summers and winters are milder. In this case, it would almost certainly prove advantageous, though not absolutely necessary, for the convalescent patient to make his permanent abode in some mild climate. The farther advanced the disease before the attempt was made to throw it off, the greater this advantage, as a rule.

MODERATELY STIMULATING CLIMATES

Characteristics. This type of climate is usually found at a moderate elevation (from 1,000 to 3,000 feet) and is characterized by a moderate range of temperature, and fairly dry air.

Cases Suitable. A moderately stimulating climate is suitable for the great majority of patients at the time that the true nature of their illness is first recognized (according to present-day methods as applied in the average case).

MODERATELY RELAXING CLIMATES

Characteristics. Low altitudes (up to 1,000 feet); where the air is either moderately dry or at most slightly moist; and moderately warm; furnish the conditions necessary for a mildly soothing and relaxing effect.

Note: Contrary to a quite prevalent opinion, *low* altitude has no effect directly prejudicial to recovery. Of course, if the case is suitable for a higher elevation, the selection should be made accordingly. But if the case calls for a relaxing climate, there need be no hesitancy in seeking health even at sea level, provided all other climatic factors and health conditions are satisfactory.

Cases Suitable. Patients suffering from very extensive tuberculosis or in late stages of the disease; patients of advanced years; patients with serious heart or kidney complications, with very high blood pressure, or whose case is complicated by diabetes; those who are markedly short of breath; those who are decidedly sensitive to even slight weather changes; extremely nervous persons; and patients who have advanced tuberculosis of the larynx—as a class, all of these require either a relaxing climate or one which is, at most, moderately stimulating.

Exception: Experience teaches that irrespective of the stage of the disease or of the other modifying factors just enumerated, patients in this group are sometimes met with who do not stand well even moderate heat. For such persons, heat is markedly enervating, and a cooler, more stimulating climate is as a rule preferable.

Worth Remembering: In certain instances, those who at first require a mild, soothing climate, can, as they grow stronger, gain benefit by seeking a climate of the more stimulating type. If other things are suitable, a step upward in altitude or climate at this time will often give one a further boost on the route to victory.

Ocean Climates

Characteristics. Ocean climates are characterized by high atmospheric pressure; much humidity and frequent fog; a moderate amount of sunshine; considerable wind; and—over the ocean—by the practical absence of germs; the temperature varying roughly according to the latitude. The salt air, through the sense of smell or otherwise, and the wind, add to the stimulation. On the whole, depending upon whether the temperature is high or low, the general effect of the ocean climate varies from marked stimulation to extreme relaxation. However, in the temperate zones, where the temperature remains within reasonable bounds, the effect is ordinarily moderately relaxing or moderately stimulating.

Cases Suitable. So far as the stage of the disease alone is concerned, no case creates a definite call for this type of climate. Some of the patients classified as requiring a moderately relaxing climate will do well in an ocean climate; whereas for others of this group the somewhat drier type of moderately relaxing climate (see

under Desert Climates below) is preferable. Coast climates have been highly recommended for children; especially, for the prevention of tuberculosis, and for the treatment of tuberculosis of the bones and lymph glands (forms of the disease which commonly occur during the earlier years of life). To a less extent, ocean or coast climates have been advised in very slight, beginning tuberculosis in adults; more especially if the disease has not yet progressed to the "open" stage. Inasmuch as the local effect of the air on the lungs is virtually absent in this group of cases, the chance that the moist air will work injury is reduced. Nevertheless it is probable that the great majority of grown persons suffering from even early tuberculosis will fare better at some inland locality where the air is relatively dry and at least moderately stimulating.

For patients who suffer from tuberculosis of the larynx and who have failed to improve elsewhere, the moist air of the coast in warm latitudes may prove soothing and beneficial.

Disadvantages. Aside from strictly climatic objections applying to coast resorts, the beach has the additional drawback of offering on every hand the temptation to take up some harmful amusement or sport, of which perhaps the most dangerous is surf-bathing. **That indulgence in the strenuous pastime of jumping the breakers has wrecked the hopes of many a patient with promising outlook is beyond dispute. For this reason, those who are contemplating a stay at the coast should not only steel themselves beforehand against yielding to this desire, but should make it a point to keep away from the more popular and crowded resorts.**

For the prevention of tuberculosis and for the treatment of tuberculosis in childhood, less attention need

be given to these features. For some of these little patients rest is not quite so essential (for example, for those who suffer from tuberculosis of the lymph glands); and the pleasant surroundings furnish suitable attractions and diversions without which it is almost impossible to keep the little folks contented.

Summing up, it may be said that while an ocean climate is not commonly to be recommended (save for children, as just mentioned), it is equally true that for a few patients a climate of this variety is more suitable than any other, altho it is difficult to lay down on paper a definite rule for picking out the cases in advance. The main lesson to be learned from a study of ocean climates is this: If for one reason or another, circumstances make it necessary for the sick person to make his home at the seaside, he may do so, resting easy in the knowledge that while the climate may not be possibly the best for him—at worst the influence will probably be less harmful than he has previously supposed.

The Question of Sea Voyages. In past years sea voyages were frequently advised. Without doubt, a few favorable results were achieved in this manner, but damage was more frequently wrought. Among the objections to a sea voyage must be reckoned rough weather, with the consequent confinement indoors; seasickness; in some cases, the poor quality of the food; and the difficulty of obtaining real physical rest—when the prevailing conditions make the opposite course the easier. To some individuals a trip on the ocean does afford one valuable element, the opportunity for thorough and complete mental relaxation. In other cases, however, the contrary effect is noted, the continued monotony day after day furnishing just the opportunity for brooding and worry. To-day, in the light of accumulated knowledge as to better methods of treatment, with the

emphasis on rest, it is apparent that a sea voyage is rarely to be advised.

Desert Climates

Characteristics. Among the usual attributes of desert climates are: almost constant sunshine and extreme dryness of the air (both factors contributing to the remarkable purity of desert air—to its nearly complete freedom from microorganisms); the occurrence of wind and sand storms at greater or less intervals; high atmospheric pressure; and a temperature during the hot season which is very debilitating for most persons, but which in places is just sufficient to make the winters warm and comfortable. In summer, save in very exceptional cases, desert climates (at low altitude) are entirely unfitted to the treatment of tuberculosis. During the winter, however, localities having a climate of this type, especially those spots favored by being somewhat protected by the desert storms, furnish a variety of "good" climate a little different from any yet so far described, wherein just the elements are combined to fit the needs of a certain group of patients. In winter, a desert climate is as a rule either mildly stimulating or moderately relaxing.

Cases Suitable. Those persons whose condition calls for a mild soothing effect or for a climate which is at most only moderately stimulating, sometimes find the happy medium in the desert climate. For example, some patients need moderate stimulation, but discover that even the medium altitude at which a mildly stimulating atmosphere is ordinarily found, does not agree with them. Others, who require a moderately relaxing climate, find that in a good many of the localities where a climate of this type obtains, the relatively moist air is an objectionable feature. In the

desert climate, both of these groups of patients may perhaps find the exact combination of climatic elements that they require.

Disadvantages. Aside from the distressful effect of the extremely dry desert air on certain patients, previously spoken of, the desert has other objectionable features as a place for recovery. Among these are: strong winds and sand storms (altho of course these do not occur in all parts of the desert); the isolated position of some of the desert resorts, which makes it quite difficult or impossible to obtain wholesome food, suitable accommodations, expert medical advice—and the like. These points should be carefully investigated before the change of residence is made.

Items to Be Carefully Weighed

From the foregoing paragraphs it is seen that the indications for climates of various types overlap to some extent, and are by no means hard and fast. So the selection must be controlled by a careful consideration of several important auxiliary or secondary factors—factors which in the end may prove decisive. These will now be taken up separately:—

1. The accessibility of the place one has in mind; the opportunity for obtaining proper food, for securing the services of a physician who has tuberculosis judgment, the probability of obtaining a capable nurse—if required; for those patients who must work—the chance of finding suitable employment; and the pleasantness and general character of the surroundings, including the possibility of obtaining recreation without at the same time doing oneself harm—all are matters for careful thought.

Relative to the last point, it is obvious that a resort situated right in the heart of the mountains, where

walking necessarily means trail climbing, is unsuited to those for whom exercise of this sort is inappropriate; and it is to be remembered that such exercise is inappropriate for most patients, at least for a long time. (Of course, this objection does not apply to those high altitudes where the lay of the land is comparatively level.)

2. A valuable hint can sometimes be obtained from one's past experiences. When the decision is in doubt, the fact that previously one has enjoyed better health in winter than in summer, or the reverse; or that in former years high altitude has or has not agreed with one; or that some particular weather change is known to have produced a bad effect—may aid in the solution of the problem. However, the mistake should be avoided of depending too fully on the fact that such and such a climate has agreed with one in the past. Such an effect should of course be given due consideration, but it should also be understood that one who is ill may respond to a particular climate somewhat differently than when well.

3. There can be no question that the outdoor life is more comfortable in a warm, than in a cold climate. For many persons, too, warmth makes for contentment, thereby favoring relaxation of body and mind. As the things which are easy to do, and which fall evenly into line with one's everyday desires, are more likely to be done than if they are disagreeable tasks, it goes without saying that the rest and fresh air treatment is oftimes much more effectively carried out in a warm, balmy atmosphere, where languor is natural and it is easy to be lazy.

A Common Error. If the fullest measure of value is to be obtained from climate it is imperative for one to live continually in the open air. I have known many

patients to travel long distances seeking a favorable climate, then on reaching the new locality to remain indoors most of the time; not indoors on a well-arranged sleeping porch, but within an ordinary house where the windows were open only a little way. Yet these persons expected to get complete benefit from climate!

Practically speaking, **a suitable climate means suitable air, and it is pure folly to expect results from even the best of climates unless one actually LIVES in the new atmosphere.**

At best, outdoor living in a decidedly cold climate makes it necessary for the patient to become somewhat of an exile, especially if he requires considerable rest; and necessitates much cumbersome bundling up, and weighting down of the body with heavy clothes and protective coverings—all of which is rather disagreeable. All in all, it is often difficult for the physician to persuade his patient to persist in the routine in the face of distasteful weather conditions. True, by sheer force of will many patients make themselves stay out of doors even tho this means virtual isolation from their friends; but there are many others who will not do so. In this regard, the saying, "The good use of a bad climate is better than the poor use of a good climate," may be usefully stamped upon the memory. Of course it is even better to make good use of a good climate.

Some Favored Spots

How often the health seeker starts for the perhaps distant state with only a very general and hazy idea as to his exact destination—intending to choose the precise locality for his future home after arriving on the ground. The result is that he draws heavily upon his rather scanty store of energy, and wastes time and money in needless travels here and there before finally

settling down. How often it comes about that his chances for recovery are in this manner lost forever. For this reason—to the end that the journey may be as direct as possible—it is highly important that the sufferer *know where he is going before he sets out.* Exprest differently, this means not only that one should have a previous acquaintanceship with the general characteristics of the new climate, but should have in mind a particular town or locality for which one is bound.

In the succeeding paragraphs will be found a fairly complete list and a brief description of the localities that enjoy a greater or less renown as places for recuperation. It goes without saying that space will not permit even the bare mentioning of *all* the localities favored with an especially wholesome climate. Notice can be taken only of the more prominent characteristics of some of the more famous resorts, situated for the most part in this country. Altho there are, of course, many other localities having just as good climates, **it is usually safer to follow the beaten path—so to speak—to stick to those places that are better known,** unless one has received positive assurance that satisfactory accommodations, medical service, etc., are obtainable elsewhere.

Preliminary to making the choice let it be understood, also, that **an absolutely ideal climate does not exist. Every locality has its drawbacks, each climate has some disagreeable days. One can only aim to select the locality in which the general trend of the weather conditions is favorable during the greatest portion of the time.**

NEW ENGLAND AND EASTERN STATES

Among those who live in the East are doubtless many for whom a long trip is impracticable. Fortunately, a

fair number of these persons may find at least moderately favorable climatic conditions near at hand. In the eastern and New England states there are many accessible places where a more or less stimulating climate is to be had during at least part of the year. The whole of this section of beautifully wooded country affords a most fitting setting for the wealth of streams and mirrored lakes—a combination that offers a wide range of diversions and pastimes for those who are in condition to avail themselves of these opportunities. For example, in the interior portion of Maine as well as in the mountainous region of New Hampshire, the air is quite stimulating despite the fact that it contains a considerable percentage of moisture. However, the rather too high humidity is to some extent compensated for by the moderate altitude and rather northern latitude, so that the summers on the whole are comfortably cool, and the air mildly and pleasantly bracing—the odor of the pines contributing to the stimulating effect. The winters are too rigorous for the great majority of persons ill of tuberculosis.

ADIRONDACK DISTRICT. Situated at an average elevation of 2,000 feet, this region has a climate that is ordinarily at least mildly stimulating during all seasons. During the winter the air is intensely cold but as a rule dry and crisp, and therefore decidedly bracing; the summers are usually moderately stimulating, altho sometimes a long hot and humid, oppressive and relaxing wave in the weather occurs. Withal, there are many cloudy days, considerable fog, snow and rain, and frequent, pronounced weather changes.

The numerous sanatoria and tuberculosis camps scattered throughout this stretch of picturesque countryside constitute perhaps its most valuable asset for the health seeker. At *Trudeau, N. Y.*, not far from the well-known

resort, Saranac Lake, is the famous Trudeau Sanatorium (Adirondack Cottage Sanatorium); while not far distant are other sanatoria of various sizes, besides a large number of boarding places where the invalid may obtain suitable accommodations.

Sea Breeze, near New York City, which furnishes a rather typical example of the eastern ocean climate, has obtained fame as a resort for the treatment of children.

PENNSYLVANIA. In the highlands of Pennsylvania is found a climate with the same general characteristics as the climate of the New York Adirondacks. At *White Haven* are several excellent modern sanatoria for patients of various means. At *Mont Alto* is the immense institution conducted by the state, branches of which are located at *Cresson* and at *Hamburg.*

NEW JERSEY. Following the usual rule, the climate of the northern and more elevated portion of New Jersey is cooler, drier, and more stimulating than that of the southern and lower part, where the weather is more even, the air moister and the climate as a whole milder. *Morristown* and *Summit,* at elevations of about 500 feet, have a year-round climate which is moderately stimulating in winter and less stimulating or even slightly relaxing in summer. On the other hand, *Lakewood,* 60 feet above sea-level, has a more even and milder climate of the coast variety. At *Morris Plains,* near Morristown, there is a small tuberculosis hospital supported by the county, but beyond this, provisions for the pulmonary invalid are scanty indeed in the three places mentioned.

THE SOUTHERN STATES

THE CAROLINAS. Asheville, N. C., 2,555 feet above sea-level, has a year-round climate of the moderately stimulating type. The weather is fairly equable

and the atmosphere moderately dry; the summers cool and the winters cold. Among the advantageous features are the beautiful surroundings, the provision for medical care, at least two well-equipped sanatoria, and a number of desirable boarding places for the sick. *Southern Pines, N. C.,* altitude about 700 feet, has a climate similar to that of Asheville, but milder and less stimulating. It has one sanatorium. *Aiken, S. C.,* at an elevation of 500 feet, has a moderately relaxing climate. Sunshine is abundant and the air moderately dry. The winters are mild, but the summers are hot and debilitating. Aiken has a good sanatorium, for *men* only in reduced circumstances. *Charleston, S. C.,* at the coast, has a pleasant, warm, moist, relaxing climate, but has the disadvantages common to all large cities, as well as the objection of having no tuberculosis sanatorium.

GEORGIA. Augusta, Ga., and *North Augusta,* just across the Savannah River, have a delightful winter climate resembling that of Aiken, altho the air is perhaps a little moister, and the weather on the average slightly warmer. The accommodations are good, altho special provisions for the pulmonary invalid are few. *Savannah, Ga.,* has the same type of climate and the same objections as Charleston, S. C. At *Atlanta, Ga.,* the weather is again a little cooler and in winter occasionally very cold—and in turn more bracing; in summer it is sometimes quite hot and oppressive. Atlanta has a large municipal free sanatorium. *Thomasville,* at an elevation of 300 feet, has an excellent winter climate of the relaxing type—warm and moist; but the summer weather is too hot for most patients.

FLORIDA. A narrow strip of lowland extending into a near-tropical sea—Florida has an equable, warm and moist, relaxing climate—of the marine type. A

land of entrancing scenery of an unusual variety, and of perpetual summer, its climate is noted for its mildness and evenness, the temperature changing very little the year round. Among the objectionable features are the numerous insects, which in many places are veritable pests. In former years when mildness was the main element sought in climate, many persons afflicted with tuberculosis sought to rescue their health through a visit to Florida. Now that it is known that better results are obtained if the individual is given stimulation in proportion to his ability to respond, Florida can less often be recommended. However, if care be used in choosing the exact locality, many places may be found in Florida suitable all the year, but especially during the winter, for such patients as need a climate of this type—provided they understand not only how to care for themselves, but are able and willing to do so. There are numerous pleasure resorts with excellent accommodations, but sanatoria or other places of lodging suitable especially for the pulmonary invalid are few. At *Port Orange* there is a private sanatorium, at *Jacksonville* and *Miami* the counties have provided tuberculosis pavilions, and at *Tampa* there is a county tuberculosis camp.

THE BERMUDA ISLANDS. Altho the Bermuda Islands are a British possession, because of their comparative nearness to the United States and their popularity, it may not be out of place to remark that the climate of the Bermudas is very similar to that of Florida, and in a general way, suitable for the same small class of patients. *Note:* The passage to the Bermudas is often rough and disagreeable—and this fact alone may call for a change of plan.

THE WESTERN STATES

In the western part of the United States is found a wide variety of climates, including almost every type useful in tuberculosis, but the air of this vast region is pre-eminently noted for its invigorating effect. Owing to the quite general elevation of this section, the atmospheric pressure is on the average relatively low and the air comparatively dry—conditions which, taken together, make for comfortable summers and for winters that vary from warm to cold, according to the exact locality, the combined result being an excellent climate of the moderately stimulating, or decidedly stimulating type throughout the year.

COLORADO. The high elevation of Colorado, and its moderately dry air and clear skies, furnish the basis of a climate that is remarkably stimulating and bracing. The summers are delightful—neither too warm nor too cold. The winters, however, are decidedly cold; but withal, the snappy, biting, dry air, tends to instil with vigor those who are sufficiently rugged to respond. Bearing out the rule of high altitudes, the daily temperature range is rather wide; the nights on even the warmest days are nearly always pleasantly cool. On the whole, the climate is as nearly an ideal one of its kind as it is possible to find, the inspiration of a grand and magnificent scenery contributing much to the sum total of health promoting value.

Denver, one mile above sea level, has an excellent climate—its only objectionable feature being the dust-laden winds which sometimes prevail in the spring and fall. In former years Denver was held in high repute as a health resort, but now has all the disadvantages of a large city, and is therefore not a very desirable place for the invalid to make his home. In its less crowded

outskirts, somewhat more favorable conditions may be found. Denver has a number of well-equipped, up-to-date sanatoria, for both the well-to-do and those of limited means, as well as a number of attractive boarding places for tuberculous persons.

Colorado Springs, about one thousand feet higher than Denver, has all the climatic advantages of Denver and is largely free from the objectionable features associated with a large city. The general trend of the weather is a little cooler. A disadvantage is the dust and wind storms, which are more bothersome than in Denver. The several sanatoria and other accommodations for the invalid are excellent.

Manitou, situated five miles from Colorado Springs at an elevation of 6,000 feet, has a practically identical climate — with the advantage that, due to its more sheltered position at the foot of Pike's Peak, wind is less frequently a source of annoyance. Manitou is a small village with scanty accommodations for the invalid, altho it has one sanatorium. *Glenwood Springs,* 5,200 feet above sea level, is sometimes recommended. It has a good hotel, but no special accommodations for those ill of tuberculosis. *Pueblo,* lying at an elevation of 4,700 feet, has a good climate, altho the summers are rather hot; but as its accommodations are very limited, it is not ordinarily recommendable.

Rocky Mountain Park, a half-day's ride from Denver, lying at an approximate elevation of 7,000 feet, has both a climate and a wonderful scenery that rival those of Switzerland. At *Estes Park,* a village situated at the entrance to Rocky Mountain Park, suitable accommodations and the services of competent physicians are obtainable.

NEW MEXICO. Situated at an average elevation of about 5,000 feet, New Mexico (especially its

northern part) is favored with a climate that is very much like that of Colorado. *Sante Fe, Los Vegas,* and *Albuquerque,* each situated at an elevation of between five and seven thousand feet, have climates resembling that of Denver, the weather at Albuquerque being a little warmer both in summer and winter. Santa Fe has two sanatoria, Los Vegas one. Albuquerque has four or five sanatoria, with other accommodations for the sick.

In southern New Mexico, at *Fort Stanton* and *Fort Bayard,* the homes respectively of federal marine and army sanatoria, and at *Silver City*—all three situated at any altitude around 6,000 feet, the climate is excellent throughout the year, the summers pleasantly cool, the winters cold. Silver City has two sanatoria and very good accommodations. *Deming,* altitude 4,300 feet, also furnishes a good winter climate, but its summer weather is too hot for the comfort and well-being of most patients.

TEXAS. El Paso, at a medium elevation, has a winter climate similar to that of Deming. Its summers are warm and occasionally quite hot. El Paso has five sanatoria. *San Antonio,* situated only 680 feet above sea-level, has a milder, more even and rather relaxing climate in the winter; its summer climate is decidedly hot and is not as a rule to be recommended. San Antonio has two private sanatoria, and also a free tent colony conducted by the county.

ARIZONA. This state has on the whole a dry, invigorating climate. Its summers are in most places hotter and its winters correspondingly cooler than those of Colorado and New Mexico, altho comparatively cool summer weather is found in the more elevated district of northern Arizona. *Prescott,* 5,200 feet, and *Flagstaff,* at 7,000 feet above sea level, are usually suitable

for outdoor living during the entire year, altho sometimes the summer weather is disagreeably hot. Prescott has three excellent private sanatoria, while at Fort Whipple, on the immediate outskirts of the city, is situated an immense government sanatorium. The accommodations are not good at Flagstaff.

Phœnix, altitude 1,100 feet, has relatively mild, delightful winters, a particular virtue of its climate being the almost complete absence of dust and wind—disagreeable features which are ordinarily coupled with this type of climate. It has several sanatoria and other accommodations for the health seeker. Its summers are intensely hot, fairly humid, and on the whole debilitating, and are not recommended.

Tucson, situated at an elevation of 2,400 feet, has a nearly ideal winter climate similar to that of Phœnix, but drier and more stimulating. The summers are quite hot, and for most persons undesirable. It has two private sanatoria exclusively for tuberculosis, one private sanatorium with a special tuberculosis department, a U. S. public health service hospital for tuberculosis, and other accommodations for those who are ill.

Yuma, right in the heart of the desert and only 140 feet above sea level, furnishes a typical example of the desert climate. So far as the climate alone is concerned, the winters are suitable for patients requiring a decidedly dry, warm, sunny, moderately stimulating or mildly relaxing atmosphere, but the summers are almost unbearably hot. There are no sanatoria and few special accommodations for the sick.

CALIFORNIA. A distinction is to be drawn between the climate of the northern half of California and that of the southern portion.

In northern California the general trend of the weather is colder than in the southern part of the state,

and near the coast there is considerable wind and the air is quite damp. Moreover, the weather is exceedingly changeable and there are many disagreeable, blustery days. Taken as a whole, the climate of the coast resorts in this part of the state is not the best, altho it is much more favorable than the climate of many other parts of the United States. *Belmont, Redwood City* and *Los Gatos,* all within a short distance of San Francisco, have each one first-class private sanatorium; and at *Palo Alto,* near by, there is a Public Health Service Hospital for tuberculosis.

Farther inland, the weather is calmer, the air drier, and the climate in general milder, tho still quite stimulating. It is well suited to patients with fairly strong reactive powers; but, unfortunately, this part of the Golden State is as yet relatively unsettled and undeveloped, and therefore largely unsuitable for the home of the invalid. There are, however, a few localities in this section where satisfactory accommodations are to be had. Of these, *Colfax,* elevation 2,400 feet, situated 144 miles east of San Francisco, has an excellent sanatorium in connection with an open-air school for tuberculosis; and *Alta,* situated about the same distance from the coast, and at a moderate elevation, has one sanatorium.

SOUTHERN CALIFORNIA. The climate of southern California is, in general, mild and moderately stimulating, yet one can live out of doors in all seasons with real comfort—a combination found in few other places. To the merits of the climate is added the charm of a beautiful and extraordinarily diversified scenery. Broadly speaking, the climate of this wonderland is characterized by moderateness—the winters as a rule being just pleasantly cool; the summers comfortable. A noteworthy feature is that the nights following even

the hottest days are nearly always cool and refreshing. The sunshine is abundant; yet sunstroke is practically unknown. The air is moderately moist or moderately dry, roughly according to the distance from the ocean and the elevation.

Los Angeles, elevation 287 feet, is rather too near the coast (twenty miles) for the best conditions, and has a good many foggy and cloudy days, besides the inherent disadvantages of a large city. There is one excellent, strictly modern semi-charitable sanatorium. In addition, in the San Fernando Valley, twenty-five miles to the north, Los Angeles county maintains an immense institution for the care of the tuberculous poor. A number of physicians who have devoted years of study to tuberculosis are to be had in Los Angeles. (At *San Fernando* there is a sanatorium conducted by the Independent Order of Foresters.)

Some nine miles farther inland, at an elevation of some 800 feet, is beautiful *Pasadena;* near by and also as one passes eastwardly up the San Gabriel valley are found many delightful spots, the air in general becoming drier and the altitude higher as one goes farther from the ocean. Some of these smaller places are: *Altadena* (adjoining Pasadena on the north), which has a modern, semi-charitable sanatorium, *Sierra Madre, Monrovia*—the latter having an excellent private sanatorium, as well as an inviting cottage service for the sick with expert medical attendance—*Duarte,* where is located a Jewish Relief Sanatorium, *Pomona, Ontario, Riverside, San Bernardino* and *Redlands;* the altitude increasing slightly (up to 2,500 feet) and the air becoming drier and warmer, as one reads to the end of the list.

Banning, twenty-five miles east of Redlands and about one hundred miles from the ocean at an altitude of

2,400 feet, has a somewhat more stimulating winter climate, and clearer skies throughout the year. Owing to the distance from the ocean and to the diverting influence of the nearby mountain ranges on the air currents, fog, which sometimes hovers disagreeably over the valley points, seldom reaches Banning. On the other hand, due to the proximity to the desert, the air is in all seasons drier and in summer slightly warmer, yet the coast is near enough so that the dryness is usually kept within moderation, and the dryness itself minimizes any discomfort from the few degrees added to the temperature. During the winter fairly strong east winds are rather frequent, which are an objectionable feature, but withal the cool, dry air is decidedly bracing. Banning has three excellent sanatoria, and a well conducted boarding place and bungalow service for the sick.

Beaumont, near Banning, has a similar climate, but no special accommodations for tuberculous persons. *Hemet,* in a valley at a somewhat lower elevation a few miles southeast, has evener, warmer winters, and more intense heat in the summer. It has one modern sanatorium.

Palm Springs, though but twenty-three miles east of Banning, yet has an entirely different climate—a climate of the desert variety about as good as can be found anywhere. Situated at an elevation of 400 feet, this little hamlet is virtually an oasis in the desert. Protected from the harshness of the main or real desert by sheltering mountains, its weather is toned down to a degree that eminently fits it as an excellent *winter* resort for persons who require an even, warm, moderately dry atmosphere. The summers at Palm Springs are very much too hot, save in very unusual cases. Palm Springs has one excellent hotel with open-air bungalows to accommodate its guests, and there are several less pre-

tentious hotels and boarding places. Special provisions for those who are manifestly ill are, however, rather limited. Expert medical counsel is to be had.

San Diego, situated down the coast near the Mexican border, has a climate agreeably tempered by its more southern location and by the ocean. The weather is very even; the winters pleasantly warm, the summers cool. The air is rather humid, and, as is commonly true at the coast, there is considerable fog during certain seasons. Compared to Los Angeles, the climate of San Diego is less stimulating, and is sometimes classed as moderately relaxing. San Diego county has one public institution and a free open-air colony for those afflicted with tuberculosis, and in the foothills at *Alpine,* thirty miles to the east, where the air is drier, there is a well-equipped sanatorium.

Santa Barbara, also on the ocean front, but about one hundred miles to the north of Los Angeles, has a climate similar to that of San Diego, altho less equable. Its summers are a little warmer, its winters slightly cooler. Santa Barbara has one semi-charitable sanatorium.

FOREIGN RESORTS

Space prohibits any discussion of the merits of the many places abroad suitable for the health seeker. In Europe, the stimulating and bracing climates are as a rule found at the higher altitudes, notably in Switzerland and Germany; the more soothing and relaxing atmospheres, along the Riviera. It may be stated, however, that the great majority of patients would do better by staying in America, not only because of the objection to a long sea voyage, but because just as favorable climates of all varieties are to be had in this country.

Where a Comprehensive List of Sanatoria with Other Information May Be Obtained

In the foregoing pages, in connection with the discussion of each locality, the endeavor has been to record briefly the presence or absence of accommodations for the health seeker. Those who wish a more detailed description of the institutions mentioned, or who desire information concerning other institutions, and the like, situated in any state, town or place not mentioned herein, should obtain Pamphlet No. 111, a Directory of Sanatoria, Hospitals and Day Camps for Tuberculosis, issued by the National Tuberculosis Association, 370 Seventh Ave., New York. In this publication will be found a comprehensive list of the available sanatoria, hospitals, camps, boarding places and preventoria for the treatment or prevention of tuberculosis, with notation of the class of cases accepted, the rates, and other useful information.

The Importance of Care When Changing Climates

The patient who has decided to transfer his place of residence, before setting out should stamp on his memory the fact that after he has been in the new locality only long enough to recuperate from the immediate effects of the journey, he will very probably notice that he has already begun to feel stronger than before. Irrespective of the nature of the climate, and perhaps following on a mere change of environment, an apparently decisive change for the better is likely to occur, altho this effect is more noticeable if the transition has been from a relatively low to a high altitude. The primary feeling of exhilaration and stimulation is often so pronounced that the invalid is led to overestimate his strength and to undertake tasks far beyond his real

power. For a time, by using all its latent energy the body is able to meet the increased demand; then comes the reaction—exhaustion; in its train there not rarely follows a relapse, which may be prolonged indefinitely, even permanently.

In order to guard against mishap, every means should be used to make the change as gradual and easy as possible. For some weeks afterward the patient should take a greater amount of rest than his case would otherwise call for (unless of course he is already at complete rest), no matter how well he feels nor how great the temptation to do more. Redoubled watchfulness during this period may save months or years of trial.

The following specific rules are designed to aid the sick person in making the journey safely. The rules may be modified as circumstances warrant to meet the precise conditions present in each case. In any event, however, unless the patient is without fever (which means that the daily temperature does not go above 98.6° F., except as noted in Lesson V. p. 132), and unless in addition all other evidence indicates that the illness is very slight, it is seldom advisable to lessen the restrictions materially.

1. Before starting, the exact destination should be determined on, if at all possible.

2. If practicable, the accommodations should be engaged in advance.

3. Read carefully that portion of Lesson IX devoted to the topic, Rest. At all stages of the journey follow as closely as possible the instructions given therein for obtaining rest. Bear in mind that the unwonted nerve strain and the more or less unavoidable exertions incident to the journey, put an unusually severe tax upon the resources. Make it a point, therefore, during the

ride to take advantage of every opportunity for securing complete rest and repose. Aim to be even more quiet and at ease than if at home, in order to offset the extraordinary wear and tear on the bodily energy.

4. An attendant should accompany the invalid to minister to his comfort and assume all the responsibilities. In lieu of this, arrangements should be made with the porter or conductor to keep a watchful eye on the patient, and to arrange for a suitable vehicle to meet him at the end of the journey.

5. The sick person should be taken to the depot in such a manner as will call for the least amount of effort on his part. An ambulance or a taxicab may be made use of, or some substitute conveyance employed. The patient should be assisted aboard the train; if he has been confined to his bed or chair he should be carried.

6. If the finances permit, a stateroom, or at least a section, should be reserved for the sole use of the patient and companion. Once aboard the train, the patient should rest reclining either on a cot or in the berth, and endeavor to relax himself completely, both bodily and mentally.

7. At both the beginning and end of the journey, the checking and transportation of the baggage, and other similar items, should be delegated to the attendant or some other person.

8. Arrived at the new locality, the invalid should be gently lifted or helped into a suitable conveyance (depending upon circumstances), and if possible, taken directly to his new abode.

9. If house hunting must be a part of the program, this duty should fall to someone else. In the interim, the patient should make himself as comfortable as possible in a hotel; or, if need be, sit quietly in the waiting room of the station.

10. If the journey is made despite the fact that color has recently appeared in the sputum, all rules should be lived up to the more rigidly. Also, preferably, in this event (and certainly if much blood has been expectorated, or if the patient has fever, or shows in any way that he is quite sick), during all stages of the journey from the time that he leaves home until he arrives at his new abode, the patient should recline upon a cot.

11. If, while on the way, the patient should spit blood, if not already recumbent he should lie down immediately, remain absolutely quiet, and avoid movements of all kinds. In this way a severe hemorrhage can nearly always be averted.

Is a Frequent Change of Climate Desirable?

In another paragraph the statement has been made that a change of climate, a change of environment, or in fact any change, is ofttimes productive of good results. In turn, there come to mind the questions: Would it not be a good plan to make a change of residence quite frequently? Is it not possible that as one tires of the surroundings, the good effect almost ceases? As the old scene and environment begin to wear on one, may it not be that by breaking the monotony and staleness, and lending an effort of continual newness, a change of residence now and then would prove of immense benefit?

In seeking for the answers, there are several important items to consider. Altho the primary feeling of well-being resulting from a change of almost any sort is worth a good deal (provided the patient does not give way to the feeling of exhilaration and over-task himself at this time) nevertheless this can hardly be looked upon as the real influence of climate. Certainly it is not its most important influence.

The most valuable effect of climate is the building up

of the fighting resources of the body, the tangible results of which appear quite slowly. As a matter of fact, this effect is not noticeable from day to day, and is in many cases hardly discernible from week to week. As a rule, months, at least, must pass before genuine improvement resulting from a real inward regeneration, manifests itself, and frequent change of residence serves only to interrupt this effect.

Circumstances That May Justify a Change. Certain circumstances, however, may render a change of locality advisable. For example, if a test of several months or a year of a particular climate has brought little or no benefit, a change may be sought, if the patient is in condition to be moved. Likewise, it sometimes comes about that the patient improves up to a certain point, but fails to make further headway. In this event, the climate may, or may not, play a part in the matter. None the less, a change of climate, with which a change of environment is necessarily associated, may add the straw that once more turns the scales in Nature's favor. Again, if the climate of a given locality is at its best only during part of the year, a change of residence may be beneficial during the less favorable season.

A Suitable Climate Often Close at Hand

When circumstances dictate a change of climate, in order to minimize the chance of harm resulting from the journey, the trip should be made as short as practicable. Fortunately, remarkable climatic differences often exist in localities separated only by short distances (this is particularly true in the western states) a fact which frequently makes it possible for one to find a suitable climate close at hand.

A Warning Against the Wanderlust

Closely linked with the subject of climate, there is one insidious and injurious influence which it is necessary for the health seeker to guard against. In nearly every part of the land he will meet persons who will tell him in a manner that carries conviction—in words which seem to be anchored in the knowledge that comes only from large experience, but which are in fact usually based merely upon a single case or at most a few cases—that by all means he should go at once to such and such a place. The friend will very likely say that in the locality or climate of which he speaks, certain of his friends made remarkable recoveries, or that he himself was granted a new lease of life through residing for a time in this or that favored spot. Hence he feels sure that like benefits await all sufferers who will accept them. The climates recommended by these well-meaning advisers differ from one another almost as much as black does from white, and are not rarely the direct opposite of that which the particular patient needs. Moreover, if the circumstances of the case or cases cited be carefully analyzed, it will often be found that climate had little or nothing to do with the improvement or recoveries which occurred.

Nevertheless, these more or less glowing claims may so tempt the invalid that he finally consents to make what may be an expensive and exhausting journey to the place recommended. On arriving at the new locality, his hopes—which have been already perhaps partially buoyed up by a pleasant anticipation of returning health—are ofttimes lifted still higher by the appealing freshness of the new surroundings. He feels quite cheered, and in turn braced and strengthened. In his enthusiasm he says to himself, "I have found the spot—

this is just the place for me." For a while he feels that he is making a rapid improvement; then as the newness wears off, the glamour fades, and doubt of recovery begins to creep upon him. While in this gloomy mood, especially if the early feeling of rejuvenation has caused him to over-tax himself so that his strength has now begun to fail, he discovers that he has not yet found the Land of Promise, which he still believes awaits him somewhere.

About this time he may come across another friend who, like the first one, knows "just the right place." Given new enthusiasm, the health seeker again becomes a victim of well-meant but ill-considered advice, and once more sets out upon a journey. Perhaps the trip proves too much for him; perhaps he again yields to the feeling of early ecstasy and invigoration resulting from the change in environment, and again over-steps the limit of his real strength; or perhaps, because he is worn out from the effects of the trip, the newness of the surroundings this time proves insufficient to give him even a temporary false strength; or, as the case may be, expecting too much, he is unwilling to wait for the slowly appearing true benefit from the new climate—so once more he is disappointed.

How often it is true that in this manner the wanderer continues his travels, first here and then there, all the time wearing down his body more and more—in the end to conclude that the disease is incurable; while all the while the prize was right at hand, had he only known it.

How to Get Full Value from Climate

A final word to the sufferer who seeks benefit from climate: Climate will prove a valuable and true friend to you, if you do not expect too much from it. Climate

not an open sesame nor a magic elixir, which alone
l restore to you the blessing of health. Above all,
erefore, do not waste your opportunities in con-
ually moving about, seeking a perfect climate—a
l-o'-the-wisp which has no existence. Instead, after
e reflection and deliberation, decide on the place
at you feel is best for yourself, then settle down,
d, endeavoring to render yourself content and
antime remembering that time is the great healer,
e full advantage of all that rest and fresh air offer
u. Later, with the return of a true and lasting
alth you will see that through this method of living
u have obtained full value from climate, and will
l that you have been amply repaid for your
tience.

LESSON XIII

HINTS ON NURSING AND SUGGESTIONS FOR THE RELIEF OF DISTRESSING SYMPTOMS

To keep the patient comfortable and happy and fully at ease at all times are of course little things, but time and again it has been proven that, to a large extent, recovery from tuberculosis depends upon little things. If the patient is to be contented and cheerful, it is necessary that no effort be spared to keep him free from pain, and from suffering and distress of all kinds.

How a Good Nurse May Turn the Tide

It is obvious that one who has given years of conscientious thought and study to the problem of helping others will in all likelihood be able to do more toward instilling hope and cheer into the mind of the sufferer, and in comforting him both mentally and physically, than will the invalid's mere friends or kin, no matter how well meant their intentions. And so it has proven: Again and again, I have seen patients going steadily downward—progressing from bad to worse; then with the advent of a competent and tactful, faithful and painstaking nurse, bringing cheer and comfort to soul and body—in this nurse's hands, I have seen the whole course of events change, so that the patient who was apparently foredoomed to failure, has turned completely about and begun the climb up-hill, thence slowly but surely onward to complete and permanent victory.

It is ofttimes hard to understand just what is the secret of the nurse's success: it is sometimes hard to be-

lieve that she is doing much at all, or, at any rate, anything new or of moment, yet she has succeeded in changing the whole outlook. Still, if you look closely you will see that her practised hand is continually ministering to some need; at one time she may be reading to the patient; again, in the course of a conversation on ordinary topics, unbeknown to him, she slips in a fitting word or two at the proper moment, inspiring him with courage to continue the fight. On occasions when his desire for food is totally lacking, she not only places before him daintily garnished and appetizing dishes, but with persuasion or a gentle word of command, as occasion demands, makes certain that the food is eaten. Watchful always, resourceful, continually on the alert to detect any sign calling for some new attention, ever looking out for the best interests of her patient and ready at a moment's notice to devise some new and ingenious scheme for promoting his welfare: such a nurse is deserving of the highest commendation—and after her patient has been led by her through the siege of sickness, and has at last come again fully into his own, he cannot say too much in praise of her.

With this little introduction to the properly qualified nurse, I wish to urge strongly upon those who are very ill that it will probably be to their inestimable advantage to have near them a nurse skilled in the care of tuberculous patients. If the finances permit, the accumulating dividends will repay many fold the relatively small investment required for this service.

The question is frequently asked whether a "trained nurse" or a "practical nurse" is preferable. If the nurse has had a thorough course of study and training in a well conducted hospital, this is an advantage, provided she has had sufficient experience with tuberculous cases (which some hospital graduates do not

have). On the other hand, certain "practical nurses" have had extraordinary opportunities for becoming adept in handling tuberculosis and with some this larger experience may more than make up for their lack of preliminary training.

Helps for the Patients

In no sense are the suggestions and instructions that appear under this heading intended to supplant the counsel of the reliable physician. Their purpose is merely to outline the first-aid treatment to be applied ere the physician arrives, and to indicate a rational line of procedure in the event that a physician is unobtainable.

Fever

In the first place, it should be understood that unless the fever is high or long continued, it does no great harm. It is the fire of disease in the lungs that is the great source of harm, and the fever is to be looked upon more as a disagreeable and distressing *result*, rather than the basic *cause* of the difficulty. As a matter of fact, fever is in a sense an indication that the cells of the body are responding to the test of battle and are putting up a vigorous fight against the germ enemy. By the same token, the mere fact that the fever shows a tendency to run in waves—now low or absent, now present or high—by no means necessarily signifies that the lungs are in worse condition at the time the fever is higher. This statement holds true whether or not the rise in fever is accompanied by a change in the amount of cough and expectoration. If these points, which have been dealt with more fully in Lesson IV, are stamped on the mind, much needless worry and discouragement will be avoided.

Treatment of Fever. The most effectual remedy for fever is absolute physical and mental rest—or as nearly complete rest of both mind and body as it is possible to secure. In other words, rest is the ideal treatment for active tuberculosis; and as the fire of disease is smothered, the fever will, as a matter of course, abate and finally cease. For details of the rest treatment the reader is referred to Lesson IX.

Moreover, it is important that the rest program be carried out in the open air; full instructions for healthful outdoor living being given in Lesson XI.

Sponging the body with cool or cold water when the fever is high, the precise temperature of the water being regulated by the requirements of each case, will often assist in making the fevered patient comfortable and contented, will aid the various bodily organs in carrying on their accustomed duties and, to a certain extent, will help in lowering the fever. (See Lesson XV for directions for administering the cold bath.)

If the fever is due to some incidental factor, such as constipation, digestive disorder, excitement, or taking cold, appropriate measures should be instituted.

Diet and Drink. During fever the body has greater need for nourishment than at other times, but also has less power to digest and assimilate food. Consequently, let the ability of the body to handle the food be the chief guide, rather than be guided by the degree of fever present. Unless there is definite evidence that the food is not being cared for properly, the rules should be: **(1) Eat generously without "stuffing"; (2) Eat foods that tax the digestive organs as little as possible; and (3) Eat foods that count.**

Milk in some form, if necessary partially predigested by following the directions enclosed with tubes of peptonizing powder obtainable of any druggist, should form

a large part of the dietary in fever. Soft and light foods, such as milk toast, toast, zwieback, stale bread, the breakfast foods, rice, soft boiled or poached eggs, custard, blanc mange, tapioca and raw scraped meat sandwiches—all are also excellent, unless shown to disagree. These articles are mentioned mainly because they are ordinarily well tolerated, but in each case the list should be widened as much as practicable up to the point where the menus are quite liberal. To vary the menu and also because it contains much nourishment, ice-cream is permissible and valuable.

Cold water should be drunk freely unless there is some valid reason for not drinking it. (In this connection, see footnote in Lesson X, p. 252.) The water should be sipped slowly and not hastily gulped down in large quantities. If it agrees, a drink of lemonade or orangeade, now and then, will be both cooling and refreshing. Stimulating drinks are ordinarily to be forbidden unless prescribed by the physician for a special purpose.

Medication. If the fever remains high despite the use of cold, or if it is not feasible to administer the cold bath, a small dose of aspirin will probably lower the fever temporarily, will ease the aches and pains of the patient, and serve to promote comfort and rest. One of the commercial 5-grain tablets of aspirin, followed by a half glass of water, is in most cases adequate; half a tablet will perhaps suffice. Aspirin has some tendency to induce sweating and to depress slightly certain weak patients, so if not accustomed to taking aspirin, the first dose should be small. In all cases the smallest dose that will do the work should be taken. Finally, let each individual forearm himself against falling into the habit of dosing up with aspirin for each minor feeling of discomfort. Remember that this drug is not curative,

but merely gives temporary relief. Temporary relief is of course worth a great deal, yet if aspirin be taken too frequently it may lose its good influence and even work injury.

No other medicine for the reduction of fever should be taken except on the advice of a physician.

SLEEP SWEATS

Excessive sweating during the night or while asleep during the day, is a troublesome feature in a good many cases. A tremendous amount of poisonous waste material is eliminated in the perspiration, and for this reason it is obvious that those who are ill of tuberculosis will sweat more than if they were well. To a certain extent, then, the tendency of tuberculous persons to sweat more than normally signifies that Nature has taken steps to protect them. On the other hand, it is a well-known fact that Nature is often inclined to overdo things—to "run a good thing into the ground." For this and other reasons it sometimes happens in tuberculosis, especially during sleep, that the amount of perspiration is excessive even above the extraordinary requirements imposed by illness. Chilling of the body and the taking of a severe cold, as well as more or less weakness, are now and then sequels of a drenching night or sleep sweat. All in all, sleep and rest are interfered with, indirectly delaying recovery; so under these circumstances measures for relief are in order.

Let this be the rule: When the sweats are light, when rest is not materially interfered with and no other serious effect is noted, *let them alone.* When, on the contrary, some real and decided ill effect is produced, *definite counteractive measures should be taken.* Fortunately in most cases some simple procedure will achieve the desired end.

General Measures. First of all let it be noted that those who have been living in cramped, ill-ventilated quarters will often be pleasurably surprised, soon after taking up the open-air life, to discover that the excessive sweating has ceased. Likewise, continual rest in bed—which is in most cases necessary for other reasons—also has a most beneficial effect on the sweats. So, too, daily sponging of the body with cold water is exceedingly useful in toning up the skin, thereby serving both as a preventive and cure for excessive perspiration.

Once profuse sweats have developed, gentle sponging of the body at some time during the day and again before going to sleep, with one of the following preparations, will be helpful.

1. Alcohol and water in equal parts.
2. Pure alcohol.
3. A mixture of a teaspoonful of powdered alum in a pint of either water or alcohol, or half and half of each. (To be shaken before use).
4. Quinine in alcohol, 60 grains to the pint.
5. A solution made by dissolving 120 grains of chloral hydrate in four ounces each of water and brandy.
6. Cologne, two tablespoonfuls in a pint of water.

Simplest and perhaps best of all is the vinegar sponge, composed of vinegar and water in equal parts, this mixture preferably applied while hot. If this fails, pure vinegar may be used.

Various Suggestions. Following the outbreak of sweat it is essential that chilling be avoided. To forestall a chill, as well as to prevent the annoying clammy feeling, those who are inclined to sweat easily should wear light flannel night garments unless the weather is exceedingly hot. The bed covering should be as light as compatible with the air temperature. If the perspiration should be so drenching as to require a change of

garment, all windows and openings through which a draft enters should be closed temporarily, and the change made as quickly as possible. If weakness follows the sweat, a cup of coffee or hot chocolate, or a little food, may be given. If necessary, a quarter or a half teaspoonful of aromatic spirits of ammonia, or an equal amount of Hoffmann's Anodyne, in a quarter glass of water, may be given to strengthen the sufferer and to tide him over the distressing period.

In refractory cases medicines to directly check the perspiration are sometimes indicated, but they should not be taken save when prescribed by a physician conversant with all circumstances of the case.

CHILLS

Definite chills are not very common in tuberculosis, altho moderate chilly feelings are of rather frequent occurrence in some cases. As regards the prevention of chilliness and chills the aim should be, on the one hand, to avoid all undue exposure, and on the other, to harden and toughen the body as much as possible by wearing reasonably light clothing, by using only a corresponding amount of bed covering, by securing at all times an abundance of fresh pure air and sunlight, by daily cold bathing, and the like. Keeping the lower limbs well protected from cold and damp, especially when sitting out in wintry air, though a small item, yet adds much to the general comfort and goes a long way toward warding off all chills.

So far as measures applicable at the time of the chill are concerned, the only points worth noting here are the giving of hot drinks; fairly brisk rubbing of the body, especially the extremities; the use of warm coverings; and the applying of external heat, by means of hot-water bags or similar devices.

The Relationship of Throat Symptoms to Lung Tuberculosis. Lest the invalid, whose throat gives him much trouble, be caused needless alarm and worry, from fear that his condition has been complicated by tuberculosis of the throat, I wish to make plain that all sorts of throat symptoms are common in pure, uncomplicated tuberculosis of the lungs. Those who wish further information on this point should read Lesson V, pp. 108 and 122.

The Importance of Voluntary Control of Cough. Many spells of racking, weakening cough can be averted entirely, or at least reduced to a negligible quantity, merely by making up the mind firmly not to yield to the impulse to cough. Even when the impulse is almost irresistible, it may often be conquered by the simple expedient of holding the breath for a moment or two. Of course it will not be possible to do away with cough entirely. But remember that for a very weak patient, one paroxysm of exhausting cough may more than undo all that has been gained otherwise in a day or longer; that each bit of unnecessary cough, restrained, means just that much energy and strength saved—just that much less tearing down of the tender fibers in Nature's lace-work of reparative tissue—just that much less work for her to do over.

There need be small fear that harm will come from restricting the cough intentionally, for as soon as the sputum has liquefied sufficiently, most of it will be carried up into the throat involuntarily, where its presence is first noticed and from where it can be readily removed simply by clearing the throat. Only occasionally, perhaps, will a slight cough be required to lift up some of the sputum that is a little thicker and more tenacious.



OPEN-AIR SLEEPING-ROOM ABOVE, LOGGIA BELOW

In this photo is shown a large open-air sleeping-room with windows that swing inward on three sides. The space below the sleeping-room is delightfully treated as an open-air sitting-room.

How Guarded Use of the Voice Lessens Cough. Then, too, many wholly useless, trying spasms of cough may be obviated merely by exercising care in the use of the voice. Again and again I have seen patients throw away their chances needlessly, solely through failure to put a check on their impulses to talk loudly and laugh boisterously. Make it a plan to speak in moderate tones, not to allow yourself to become excited, nor to converse too long at a time. Likewise, keep your laughter within the bounds of moderation, especially if you notice that cough follows a too hilarious outbreak of mirth. If the slightest use of the voice provokes a seizure of cough, it may be advisable to speak only in whispers, or to stop speaking entirely and adopt some signal system, or have recourse to a writing pad. Singing, and any other acts necessitating excessively rapid or too deep breathing, should be forbidden.

Posture As an Aid to Expectoration. A simple change of position is sometimes very helpful in clearing out the secretions. For example, one often learns from experience that resting on one side or the other, or even upon the stomach, makes a great difference in the ability to raise the discharge. Again, if one reclines with the head and shoulders over the edge of the bed so they are lower than the body, this may prove of much assistance. When this proves true, it is a good plan to assume the new position for a few minutes at regular times once or twice daily; remaining in this posture until with the aid of gravity the accumulated secretions have been removed.* As a rule, the early morning hour is

* The more or less continual elevating of the foot of the bed is the distinctive feature of the *Jacobi postural treatment* of tuberculosis. There is no doubt that in certain instances this procedure aids materially in keeping the breathing passages cleaned out. In selected cases it is probable that the influence of gravity in increasing the quantity of blood in the lungs, carrying material for repair, is also in this way of value in promoting healing.

best suited to the purpose. Once the secretions that have been formed during the night have been drained out, complete relief from cough and expectoration may be had for a number of hours.

Home Remedies and Other Suggestions. The application of a cold cloth or compress to the throat, or a cold wet jacket to the chest, overnight (according to the directions given in Lesson XV), will often prove very grateful to one who suffers frequently from rawness and discomfort in the throat, also affording surprizing relief from the perhaps associated harsh and distressing cough. In other instances a hot compress will be of more service. *Rule:* Apply cold or heat, according as one or the other best answers the purpose.

A very trying cough may often be quieted merely by taking sips of ice-water or cold water, or by allowing a small piece of ice to melt in the mouth from time to time. Water with a little sugar in it, or water containing glycerin in the proportion of a tablespoonful to the glass; the sipping of a little orange or lemon juice, or of a glass of milk; gargling the throat with water containing a few drops of essence of peppermint; and the chewing of a stick of gum—all are simple yet effective means for relieving the dry, parched, uncomfortable feeling in the throat, for suppressing throat tickle and quieting cough. Again, a mild lozenge of some sort, such as a plain lozenge of slippery elm or of licorice, or a mentholated troche, answers the same purpose. A wide variety of excellent lozenges combining various soothing ingredients are also to be had, among which you are almost certain to find one furnishing just the right combination for your own case.

A drink of *hot* water or a glass of *hot* milk will perhaps serve to "loosen" the expectoration and make easier the raising of the discharge. This effect can

often be promoted by stirring into the glassful of water a quarter teaspoonful of baking soda.

The early morning cough, and to a less extent cough at other hours, has quite a noticeable tendency to produce gagging, which not rarely terminates in an attack of vomiting. When this tendency is at all pronounced, it is well to postpone the eating of breakfast until perhaps half an hour after the morning house cleaning is over with. In this way the loss of the meal can usually be obviated. Under these circumstances, too, it is wise to lie down, to avoid all excitement and to rest very quietly for an hour after the meal. If food is vomited by a patient who is very weak and in urgent need of nutriment, after permitting a suitable interval to elapse for the stomach to settle, he should again partake of food.

For the weakness following a prolonged spell of severe coughing, the holding of smelling salts (carbonate of ammonia) close to, but not too near, the nostrils for a few seconds; or the drinking, in a convenient quantity of water, of a quarter or half teaspoonful of either aromatic spirits of ammonia or Hoffmann's Anodyne, will usually afford prompt relief.

Steam Inhalations. The inhalation of medicated steam—a mode of treatment that can easily be carried out at home—is often of benefit. The simplest way in which to take the inhalation is to put the required quantity of medicament in a pan of water boiling on the stove, or into a teakettle, then lower the head as close to the vessel as comfort permits, and breathe in the medicated vapor for twenty minutes or longer, three or four times daily. The effect may be increased by covering the head with a towel, or by making a paper cone, the larger end of which is placed over the spout of the kettle or over the vessel, while the other end is held over or near the nostrils. A so-called croup kettle, or

one of the commercial vapor inhalers, is a practical labor-saving device for taking the inhalations.

Formula 1

Compound tincture of benzoin. One teaspoonful to one tablespoonful to the pint of water.

Formula 2

Turpentine (chemically pure). One-half to one teaspoonful to the pint of water.

Used in the proportions indicated, either of these household remedies, especially the first, makes a cheap and excellent inhalation for irritating or rasping cough and distressful feelings in the throat.

Formula 3

Creosote
Twenty drops to the pint.

Formula 4

Oil of Scotch Fir, 30 drops
Oil of eucalyptus, 30 drops
Creosote .....10 drops
Menthol .....10 grains
Compound tincture of benzoin..... 2 ounces
One teaspoonful to the pint

Formula 5

Spirit of chloroform .....30 drops
Creosote .....90 drops
Terebene .....90 drops
Oil of Scotch Fir..90 drops
Alcohol—to make 1 ounce
20 drops to the pint.

Formulas 3, 4, and 5 are useful in gradually reducing the cough and in lessening the quantity of sputum.

Important: After using any of the moist-air inhalations do not go into the cold air for a least half an hour. If this rule is adhered to, colds, which may otherwise be a sequel of the treatment, will be prevented.

Cold Inhalations are also of benefit, and may practically be continued for a longer period at a time. A few drops of the medicament are dropped on a pledget of

cotton placed in the closed end of a small and short cone of paper or paste-board, which is then held to the nose or close to the nostrils, and the fumes inhaled. Or a ready-made inhaler, purchasable at small cost, may be more convenient. Pure creosote, alone, is ofttimes useful for cold inhaling. In case the cough is decidedly pronounced and the sputum profuse yet fever is absent, the breathing in of the creosote vapor may, if practicable, be continued for several hours at a time, or even for the greater part of the day, to advantage. If the expectorated matter is decidedly sticky and thick, and foul smelling, the likelihood is increased that creosote will be helpful. The inhaler or mask may be kept in place by a band fastened round the head, removing it from time to time to replenish the medicament. Used in this manner, creosote is not only an efficient deodorizer, but often accomplishes much toward reducing the amount of cough and discharge.

Formulas 4 and 5 above are also useful for cold inhaling.

"COLDS"

In regard to "colds," it is necessary to emphasize again that the little flurries occurring now and then in certain cases, which are usually assumed to be ordinary colds, are often merely the little ups and downs of the disease. As a rule these little characteristic fluctuations in the symptoms call for no special treatment, other than the faithful observance of the rules of living specified in the previous lessons. This means, of course, that if not already confined to bed constantly, additional rest should be taken at this time. If this is done, within a week or two the symptoms will in nearly all instances subside without further attention, tho occasionally the little flurry may be drawn out over a considerably

longer time. Even in this event, the continued confident adherence to the rest schedule will in the large majority of instances serve to carry one safely through the stormy period; whereupon, to one's surprise and gratification, the discovery perhaps may be made that healing has been going on all the time, and that one is now in position to regain strength and recuperate more rapidly.

Genuine colds may, however, be contracted, but they too are best treated by rest in bed, by attention to the bowels, and the like. A mustard plaster may be applied to the chest, or other means of producing counter-irritation employed. If the patient is not too weak, a hot drink and a hot bath, to induce sweating; and a hot mustard foot-bath (made by mixing a tablespoonful or so of mustard in a pail of hot water), after which the patient immediately gets into bed and covers himself well—taken at the onset, may aid materially in throwing off the cold. Sweating may be encouraged by covering the patient with warm blankets, by placing hot-water bags in the bed, and by the administration of one-half teaspoonful of sweet spirit of niter every two hours for a few doses. *Caution:* When any measure to induce sweating is employed, care should be taken to avoid unduly exposing the body, else more cold may be taken.

Note Regarding the Prevention of Colds. The open-air life and the avoidance of other persons afflicted with colds, are the most important measures of prevention. Vaccines for the prevention of colds are also of some value. In addition, it may be usefully remembered that certain persons who habitually overeat are especially susceptible to colds. Limiting, especially, the sugar and starches in the dietary, will sometimes help to overcome this susceptibility. In no case, however, should nutrition be slighted by cutting out articles of food that are really necessary.

BLOOD SPITTING: HEMORRHAGE

Altho some patients never bring up even the slightest tinge of blood from the lungs, yet on the whole the spitting of blood is a characteristic feature of tuberculosis, and in a smaller or larger quantity, blood is raised during some stage of the disease by perhaps a majority of patients.

Some Common Misunderstandings Rectified. Because the source and mechanism of the bleeding is often not fully understood, with the result that inappropriate treatment is applied, it may prove profitable to give a few moments to discussing these matters, ere the measures for preventing and combating hemorrhage are described.

At the start, let it be explained that any loss of blood is a hemorrhage. A quite general impression is abroad that only the coughing up of a fairly large quantity of blood is to be looked upon as a hemorrhage. As a matter of fact, the term *hemorrhage* means simply a flow of blood, or plain *bleeding;* hence the appearance of the smallest amount of blood indicates that a small hemorrhage has taken place somewhere. In the absence of definite and conclusive proof to the contrary, the only safe rule is to assume that the blood comes from the lungs, and to act accordingly. Far, far too often in the past it has been erroneously taken for granted that the source of the blood has been the gums, the throat, the nose, etc. The sequence has been that in the absence of suitable precautionary or corrective measures, many lives have been needlessly lost. True, the blood *may* come from any one of these less important sources, but unless positive and convincing evidence supporting this belief is forthcoming, it is folly to allow one's actions to be governed by such an assumption.

Second: Let it be understood that many hemorrhages

cease spontaneously with no treatment or management whatever. Sometimes even a very profuse hemorrhage will stop completely without the slightest amount of rest, even tho absolutely no protective or antidotal measure is taken. Yet it is never wise to wait with trust and hope that the bleeding will cease of its own accord; for in many cases it will not do so.

Nevertheless, the fact that many hemorrhages are checked by Nature without assistance, leads to the question: Is it necessary to pay attention to an occasional tinge or spot of blood in the sputum? The answer is: Yes. While it is true that in some cases the spitting of small quantities of blood or blood-streaked sputum is continued for weeks or months without ill-effect, yet there is always the chance that a serious hemorrhage will occur at any time. In no case, therefore, should even the smallest amount of blood in the sputum be ignored, except on the advice of a physician adept in treating tuberculosis.

Third: Almost all hemorrhages, no matter how large or how long continued, or how often repeated, can be ultimately checked, if measures that give Nature half a chance be consistently and perseveringly applied.

THE TREATMENT OF HEMORRHAGE

The essential items in the treatment of hemorrhage are: (1) *Rest,* spelled with a capital R, (2) measures designed to allay the cough, (3) the gentle unloading of the bowels, (4) restriction of the diet, and (5) the application of cold to the chest and heart.

1. Rest and Posture. At the first sign of bleeding, if up and about, lie down at once, and (remembering that the flow of blood is almost certain to stop if the simple steps above mentioned are carried out—remembering also that rest is the most important item of all,

and that a definite and decided turn for the better sometimes dates from a hemorrhage*)—calm yourself as much as possible, and rest at ease, meanwhile shifting the bodily position, especially the chest and arms, little if at all.

Both mental and physical quietude are important. One of the chief aims of treatment is to reduce the pressure of the onward-coursing blood against the vessel wall at the site of the bleeding. To obtain this object, it is important to secure as nearly as possible absolute rest and relaxation of mind and body.

The recumbent position is proper, although the semi-sitting posture is sometimes an advantage. Pillows or a back rest may be utilized in raising the head, shoulders and chest, but whatever form of support is used, the muscles must be under no strain and the patient must not support himself at all. Elevating the head of the bed accomplishes the same end—the aim being to procure the aid of gravitation in lessening the quantity of blood in the lungs. If, however, the hemorrhage is so large that the blood floods the bronchial tubes so continuously that there is pronounced difficulty in breathing, it may,

* This is in some cases accounted for by the more complete rest taken as a result of the hemorrhage. In part, too, there is at times a direct connection between the *cause* of bleeding and the stimulation of repair and healing. Everyone knows that the slightest irritation or scratching is liable to cause an oozing of blood from an actively healing sore or cut on the surface of the body. This is because Nature has constructed in the neighborhood a network of new blood vessels to carry a larger supply of reparative material to hasten the union of the edges of the cut. For the same reason, Nature endeavors to send an increased supply of blood to the tuberculous lung. It can readily be seen then, how a spell of coughing, unusual excitement or exertion may increase the force of this circulating fluid sufficiently to cause the rupture of one or more of the delicate, newly formed blood vessels. Again, if at any time previously the wall of a large vessel has been weakened, how the combination of these factors may cause the thin spot in the wall to give way. This explanation could be extended, but whatever the exact connection between the two events, it is often true that in the train of the hemorrhage there comes a definite change for the better. However, as it is in no case possible to predict in advance that the end-result will be thus favorable and happy, *all means for checking the bleeding should be used in every instance.*

on the contrary, prove beneficial to raise the *foot* of the bed. In this case, gravity is turned to account in the opposite direction and for a different purpose. The lowering of the head not only helps to empty the bronchial tubes of blood, making breathing easier, but causes a brisk flow of blood to the brain to sustain the vital centers during the period of weakness which often is a sequel of a large hemorrhage. In this manner a fainting spell can usually be averted.

If it is known with reasonable certainty from which lung the hemorrhage comes, it will perhaps be helpful to lie on that side, provided the breathing is not materially impeded by so doing.

When spitting out the blood, a shallow receptacle should be used, so that it will be unnecessary to raise the head. If the patient is reclining on his back, the head may be kept turned to one side, or may be turned aside when necessary; then with the edge of the receiving vessel held against the cheek, the blood should be expectorated with as little effort as possible.

Only those in attendance on the patient should remain in the room.

2. Restriction of Cough. Every voluntary effort should be made to restrain the cough, unless coughing is absolutely necessary for removing the rapidly accumulating blood, to allow free breathing. Breathing will almost never be seriously interfered with except in very large hemorrhages. In all other cases every bit of cough should be checked by force of will, if possible, no matter how hard it is to resist the temptation. On no account try to force out the clotted blood. Bear in mind that it is necessary for the clot to harden and set, in order to effectually seal the hole in the bleeding vessel. Coughing up the clots will but multiply Nature's labors in this direction. No talking should be permitted unless

absolutely unavoidable; even then one should speak only in the lowest tone or whisper.

If medicine to allay cough has previously been prescribed by a physician, the customary dose of this medicine should be administered, provided a dose has not been taken just shortly before, or unless there is some sound reason for not giving it at this time.

Important: At time of hemorrhage it is important to avoid gagging or vomiting, so when administering any medicine inclined to irritate the stomach, careful estimate should be made of whether the remedy has sufficient value to warrant this risk. For the assistance of the physician it is advisable to make careful note of the medicine administered.

3. Attention to the Bowels. Unless the bowels have moved freely just previous to the hemorrhage, a satisfactory evacuation should be secured in the least disturbing manner as soon as practicable; thereafter, one or more daily movements should be obtained by suitable means. In some cases an enema (rectal injection) of warm salt water will best serve the need. Other ingredients, such as those mentioned at the end of this lesson, may be added to the injection fluid if required. Ordinarily, however, a good dose of salts, or some other form of saline,* repeated as necessary to keep the bowels moving more freely than normal, will be better than an enema.

Note: The *effervescent* salines, such as the citrate of magnesia and the Seidlitz powder, create undesirable pressure in the stomach at this time, yet if ordinary

* All saline preparations have a doubly valuable effect in time of hemorrhage. (1) They serve to clear the bowels *quickly*, thus rapidly removing poisonous material that if retained would tend to raise the blood pressure. (2) Salines abstract water from the tissues of the body, and it is this water, pouring into the intestines, which produces a thorough flushing of the bowels. In turn the removal of fluid from the tissues and blood, brings about a decrease in the total volume of blood in circulation, thus assisting in another manner in reducing the blood pressure.

salts has a tendency to produce vomiting in the given case, an effervescent preparation may be preferable.

If some other laxative or cathartic seems more appropriate it may be given, provided the object—the securing of free and loose evacuations at rather frequent intervals, without, however, being so frequent as to weaken the patient excessively—is attained.

The patient should not get up to go to the toilet, but should use a bedpan and urinal.

4. Food and Drink. The administration of nourishment should be stopped at once and not resumed for at least a number of hours. Fluid should be held to the minimum. Small pieces of ice allowed to melt in the mouth from time to time will serve both to allay thirst and to reduce cough. Whatever liquids are taken should preferably be drawn through a glass tube, a piece of rubber tubing, or a straw, in order to avoid raising the head. Likewise, friendly aid in feeding the invalid will be worth a great deal. The first nourishment should consist of only a very small quantity, and for a long period the food should be simple, easily digested, and light or soft, so as to require but little chewing. No hot or stimulating food or drink should be taken. Milk, buttermilk, cottage cheese, junket, blanc mange, tapioca, boiled rice, toast moistened with milk or water, the softer breakfast foods, and soft boiled or poached eggs, are among the permissible articles.

An article that serves to satisfy the craving for food without harmful effect, and which is thought to have some special value in checking the bleeding, but which is worth little as a food, is gelatin. On the whole, preparations of gelatin may be given a rather frequent place on the menu at these times.

5. Cold Applications. When it can be judged with reasonable accuracy from which lung and from what

part of the lung the hemorrhage is occurring, an ice-bag should be placed over that area, and the supply of ice replenished from time to time. If the skin becomes blue, remove the ice-bag until the skin has again taken on its natural color. In an emergency, a small flat piece of ice or a number of chips wrapped in a piece of oil cloth or other covering, will make a satisfactory substitute. If the heart-beat is very rapid or tumultuous, an ice-bag or cold applications placed over the heart will help in quieting it.

Note: It is important not to run to extremes in the use of cold. Care should be used to avoid chilling the patient, else more harm than good may be done.

How Long Should Rest Be Continued After a Hemorrhage? During the first twenty-four hours, at least, it is safest to rest constantly in the same position in bed, if the loss of blood amounts to more than a teaspoonful or two. Even if the quantity is smaller than this, the patient should remain in bed, but it is not essential that he lie constantly in one attitude. At the end of this period, or later, as seems best, if all goes well the invalid may be cautiously turned and given a chance for gaining comfort. For some days, however, moving about in the bed should be curtailed to a reasonable minimum, and the services of friendly, assisting hands availed of each time that the position is shifted ever so little.

In the event of the bleeding continuing for several days or more at a time, the period of absolute rest should also be prolonged, and all precautions redoubled. If more than a teaspoonful of blood has been expectorated, it will be wise as a rule for the patient to remain in bed for at least ten days after all trace of color has disappeared from the sputum. Previous to this, however, provided there are no other reasons in the particu-

lar case for enforcing continued rest, he may be permitted to sit up in bed for at first a very brief, then a longer time, each day.

When allowed to get out of bed, walking is not to be undertaken for some time. First, it is necessary to go through the step-like process of sitting in a chair, a little longer each day; by and by adding a few steps around the room to the allowance. So on, day by day, degree by degree, the convalescent progressively gets about more and more. For a long time, all moving about should be done with extraordinary care and watchfulness, and all movements that entail deep breathing should be especially avoided.

Exception: Now and then instances of hemorrhage occur wherein the bleeding is more in the nature of a passive *oozing* at occasional intervals, rather than an active streaming of the blood—the so-called "congestive" hemorrhage. In the management of a congestive hemorrhage one may be permitted a few more liberties; thus, for example, from the beginning one may be allowed to sit up a short time each day or even to move slowly about the room a little. Very limited movements of this sort may even have a beneficial influence. Remember, however, that the spitting of sputum which is merely blood-streaked is also very often the forerunner of a serious hemorrhage, and that the most expert physician sometimes has difficulty in deciding the exact type of the bleeding. Hence, those who are dependent wholly upon their own judgment will do well, in all instances, to base their actions on the assumption that the bleeding is not "congestive," and to carry out faithfully the rest regimen.

The Pneumothorax Treatment of Hemorrhage. In recent years a practical method of causing collapse of the lung, relieving it of its accustomed work and giving

it opportunity for rest and repair, has been developed. This procedure, called induced or artificial *pneumothorax,* is fully described in Lesson XV. Here, it appears desirable merely to call attention to the fact that this method of treatment will sometimes check hemorrhage and save life after all other means of control have failed.

Recurrent Hemorrhages—A Note of Cheer. Now and then a case occurs in which one series of hemorrhages follows on top of another, day after day, week after week, and occasionally—month after month. Under such circumstances the sick person is likely to feel greatly disheartened, and finally to become convinced that the bleeding will never be permanently checked. None the less, even in such cases, there is a way out. That one may understand how the offending vessel is at last conquered, it may be helpful to explain why, in such cases, the bleeding is not checked immediately.

For example, let a concrete case be taken. Suppose a hemorrhage, or a series of hemorrhages, has just occurred. As a result of the loss of blood the total quantity of the circulating blood decreases, and in turn the blood pressure (the force exerted by the onsweeping blood against the inside of the blood channel) is lessened. Thus opportunity is given for the formation of a firm clot at the point of rupture, and sooner or later the bleeding ceases. Time passes, and, as the individual recuperates, his blood is enriched and augmented in amount, and the blood pressure again raised. This elevation of the blood pressure alone may be sufficient to renew the bleeding; if at this time the invalid should suddenly and forcibly exert himself, or if he should have a spell of violent coughing or become unduly excited, another hemorrhage is even more likely to supervene. Should a second hemorrhage, or a series of hemorrhages,

actually take place, the blood pressure again falls, and the flow of blood is once more checked. Then comes another interval of convalescence, during which the individual builds up and perhaps gains in flesh, while coincidentally the number of his blood corpuscles becomes greater and greater and his blood pressure higher and higher. Now, again, especially if he is not careful, the bleeding may start anew a third time.

In this manner the vicious circle of events may continue indefinitely, leading to great discouragement and causing the sufferer to feel that he is indeed "between the devil and the deep sea." He notices, perhaps, that the eating of food, which he urgently needs to furnish him with more energy for the fight, does harm by adding to the elevation of blood pressure, thus indirectly increasing his difficulties.

For a time the pathway to health may indeed appear dark, and a stout heart may be required to continue. There is one fact, however, to which one may hold fast at all times. When every ray of light is blotted out, remember that any day the clouds may be wafted away, revealing the sunlight of health, perhaps even brighter and closer at hand than before. With patience and persistence, it is probable that sooner or later a firm clot will form and effectually seal the opening in the vessel. In other instances, Nature will increase the thickness of the vessel wall, till finally the channel is obliterated; or, again, the shrinking of the new-formed healing tissue (scar) will squeeze firmly upon the offending vessel, shutting it off and effectually preventing further bleeding. Remember that a will to continue the fight, to grit the teeth and keep on when all seems lost, has again and again turned defeat into victory. Remember that many others have passed through just such periods of doubt and gloom, of lost faith and waning hope—only

in the end to discover, to their great joy and surprize, that their lungs had been healing all the time—to find the goal just that much nearer. Bear in mind, too, that the ultimate results in even severe hemorrhage cases are on the average excellent.

How to Guard Against Future Hemorrhages. Women who at any time have had hemorrhages may providently remain in bed during the menstrual period —a time during which the liability to hemorrhage is somewhat increased. So too, bearing in mind that constipation often precedes a hemorrhage, pains should be taken at all times to keep the bowels in as nearly normal condition as possible. If at any time a tinge of blood appears in the sputum, make it a plan to go to bed for at least a day, or at any rate remain in the room.

PLEURISY

Probably a majority of patients have at least a "touch" of pleurisy at one time or another; and as the condition is usually more or less painful, it is quite natural to take for granted that one has had a serious setback. Yet, in many instances, pleurisy is known to be a step toward healing. For example, it has been quite often observed that convalescence and recuperation have proceeded more rapidly after an attack of pleurisy. Do not, therefore, take these flare-ups of pleurisy too much to heart, but remember the likelihood is large that even without treatment the pleurisy will cease in time (usually within a week or two) and that it is not unlikely that improvement will take place more rapidly thereafter.

Still, as pleurisy is usually more or less painful (the acute attack being in most instances brought to the attention of the sufferer by a knife-like stab-in-the-side,

causing him to catch his breath)—and as an increase in the cough and a rise in the fever are often associated, counteractive measures are called for. The chief of these will now be briefly described:

1. If the patient is up, and if the pain is severe, or if fever is present, he should go to bed and remain there till the symptoms have subsided entirely, or at least moderated greatly. Rest is probably the best treatment under any circumstances.

2. Secure an ample evacuation of the bowels by suitable means.

3. Eat only such food as is readily digested. The hints on diet and drink given under the topic "Fever" earlier in this lesson will serve as a guide.

4. One or more coats of iodin may be painted over the painful area every day or two, regulating the frequency of the applications by the relative sensitiveness of the skin. As a result of the application, a feeling of moderate warmth or burning is to be expected and desired, but blistering is to be avoided. As an alternative procedure, a mustard plaster (directions for the preparation and use of which will be found near the end of this lesson) or some other form of application capable of inducing moderate counter-irritation, may be employed.

5. An ice-bag or cold compress may give relief, but as a rule a hot-water bag or heating pad is more efficient. *Rule:* Apply heat or cold, according as one or the other proves more useful in easing the pain. If heat proves more grateful, and if a daily cold sponge bath has previously been taken, it will probably be best to omit the cold baths temporarily. It may be worth while remembering that a drop-light equipped with a funnel-shaped reflector, which may be easily slipt under the bed covers, makes a very good substitute for an electric heating pad.

6. Fixation of the affected side with strips of adhesive plaster, for the purpose of limiting the depth of the breathing, is one of the most effective means of checking the pain and cutting short the attack. The decision as to whether or not it is wise to limit the motion of the side in this manner, as well as the actual application of the plaster, of course falls within the province of the physician.

For relieving the pain of pleurisy, when mild, one or two 5-grain tablets of aspirin, followed by a half glass of water, may be taken every two to four hours for a few doses, or, if no untoward effect is noted, the tablets may be taken over a longer period. *Important:* Remember that aspirin has no direct curative action and is somewhat depressing to the heart and circulation. It also has a tendency to cause sweating. If the patient is weak, aspirin should be given very cautiously, and in any case if weakness seems to be induced or exaggerated, the dose should be reduced, the interval lengthened, or the use of aspirin abandoned.

Medicine for the relief of severe pleural pain, as well as other treatment, must be left to the judgment of the physician.

"Water on the Chest:" Pleural Effusion. In some cases of pleurisy, fluid accumulates in the space between the lung and the chest wall (pleural effusion). By compressing the tuberculous lung, easing its labors and promoting rest, this fluid often serves as an aid to recovery. On the other hand, the accumulation of liquid sometimes grows so large as to seriously interfere with breathing, or does harm in other ways. In this case the partial or complete withdrawal of the fluid by means of a hollow needle inserted through the chest wall (tapping) may be demanded. In some cases it is necessary to "tap" several or many times.

ACHES AND PAINS

Aches and pains and sore spots over the chest, usually of a mild or moderate nature, are rather characteristic of tuberculosis, altho they do not occur in all cases. No doubt many of these indefinite pains and aches are due to mild pleurisy; or to the effect of weather changes and the like in causing a congestion of old scars in the lungs and of pleuritic thickenings and adhesions.*

In some cases the pain continues or recurs persistently in one place; but in others it is of a wandering character —one time in one part of the chest, the next in a totally different spot, and so on, continuing its migration from place to place. Again, it is referred to points outside of the chest, most frequently to the shoulders, neck or arms. Such pain is apt to be due to a *neuritis* (nerve inflammation), initiated in the chest and extending outward and eventually to the nerves supplying the exterior parts of the anatomy just mentioned. In other instances the pain is merely referred outward, without actual inflammation of the nerves—*sympathetic, referred* or *reflex* pain. When the pain is located chiefly in the muscles, it is spoken of as muscular pain or *myalgia;* or it may be mistakenly ascribed to the familiar cover-all—rheumatism. Not rarely it is impossible to pin the pain to any single, definite cause—except to say that the real root of the trouble is the tuberculous process in the lungs.

In any event, the main thing to remember is that in only a few cases does pain indicate the onset of a serious complication. In the great majority of cases it is with-

* The pleura is the thin, membranous lining that covers the lungs, and which is reflected onto the inner surface of the chest wall and to a certain extent over neighboring organs within the chest. As a result of inflammation (pleurisy) this membrane sometimes becomes thickened to many times its normal thickness; again, the inflammatory process leads to the gluing together of the two surfaces of the pleura, finally resulting in the formation of either thin and delicate, or thick and tough, bands connecting the lung to the chest wall and surrounding parts (pleuritic adhesions).

ut serious significance and, given time, will in all likelihood disappear of its own accord, tho appropriate treatment will often serve to check it more promptly. Do not, then, permit yourself to become deprest and discouraged merely because you begin to suffer from pain; or if pain has been previously present, because it becomes worse for a time. Remember, too, that in certain instances pain becomes prominent or is noticed for the first time when the lungs begin to heal (as explained in Lesson VIII).

Treatment of Pain. The application of a coat of iodin or a mustard plaster to the seat of pain often brings prompt relief. Or oil of wintergreen, either mixed with five parts of olive oil or less, or even used undiluted, may be applied. If distinct tender points are present along the course of the nerves, the application of firm pressure with the finger tip to the painful spot for three minutes by the clock, tho increasing the pain at the time, will afterward often give much relief. Gently kneading and rubbing the parts once or twice daily is also very valuable in some cases. A good counter-irritant and pain-relieving liniment, such as the following, will perhaps increase the beneficial effect of the massage:

Menthol	120 grains
Tincture of belladonna	½ ounce
Tincture of aconite	½ ounce
Chloroform	1 ounce
Spirit of camphor	enough to make six ounces.

Internally, aspirin may be taken as described under "Pleurisy."

STOMACH AND BOWEL DISTURBANCES

In Lesson IV it has been explained how and why disturbances of the stomach and bowels and other abdominal organs are on the whole rather common incidents in tuberculosis. Here it may be added that these upsets, of one sort or another, often lead to much needless worry, through causing the patient to suspect that after all he has not tuberculosis of the lungs, and that he is being treated for the wrong ailment. At any rate, owing to the prominence of the symptoms on the part of the digestive organs, he is likely to feel that the lungs are not the chief seat of difficulty. Or again, he may become convinced that he has acquired some wholly separate, serious stomach or bowel ailment; or that tuberculosis of the bowels, or some other complication or new disease has developed.

Now, let these fears and forebodings be set definitely aside. Let it be known and understood that all sorts of derangements of the digestive system, ranging all the way from indigestion, with fermentation, gas-formation, sourness, burning, more or less pain and even vomiting—to "biliousness"; from obstinate constipation to prolonged and intense diarrhea—all of these disturbances and others, are characteristic accompaniments of tuberculosis of the lungs, uncomplicated by tuberculosis elsewhere. The digestive organs of the invalid are unusually sensitive, and dietary indiscretions are sometimes responsible for the disturbances, yet often no provoking cause can be discovered. A few more fortunate patients are never distrest in this way, but the majority of cases are marked by at least one upset of the sort—often by many.

Of course, those who have tuberculosis may fall heir to other ills. They are not immune to the separate and distinct disorders of the stomach and intestines simply because they have been attacked by tuberculosis. The

same as other persons, they run a chance of acquiring, for instance, a dilated stomach, appendicitis, inflammation of the gall-bladder, etc., or true tuberculosis of the bowels may develop. What I wish to impress is that this is not usually the case. The physician will of course take all possibilities into consideration, but in most instances it will be found that the patient is only having an experience common to a large number of those afflicted with tuberculosis. As a rule, the disorders will yield to simple measures, and in most cases coincident with the healing of the lungs, the tendency for the attacks of abdominal distress to recur will grow less and less.

How to Forestall Trouble. Attention to the following points will obviate many of these distressing disturbances:—

1. Use care not to swallow the sputum. *Note:* There need be no fear that serious consequences will follow if a small quantity of sputum is inadvertently swallowed. As a matter of fact, it will be impossible to altogether avoid swallowing the sputum (as, for example, during sleep); but not the slightest trace should be swallowed voluntarily. Sputum is irritating to the mucous membranes of the stomach and bowels, and is apt to produce various annoying and baneful non-tuberculous derangements of these organs. There is also some chance that the habitual swallowing of this matter, which should be expectorated, may lead to tuberculosis of the bowel, though this danger is not nearly so great as many suppose.

2. Clean the teeth frequently and have them kept in repair. Even more important, make sure that there are no hidden abscesses at the roots (an X-ray examination will determine this) and that the gums are in healthy condition.

3. Let the rules and suggestions given in Lesson X guide you in selecting your dietary. Be especially chary of overeating. Eat sparingly, if at all, of foods that serve merely to satisfy the appetite, while contributing little to strength, blood and fighting efficiency. Be wary, lest they turn out to be only trouble-makers. Masticate all food thoroughly.

General Suggestions for Relief. Once the digestive functions have been thrown out of order, if it is strongly suspected that certain foods are at the bottom of the difficulty, or if from past experience it is known that certain particular articles are liable to provoke trouble, these foods should be promptly dropt from the bill-of-fare, unless the need for them is great.

A Test and a Remedy. It is worth remembering that (1) sagging or dropping of the abdominal organs below their normal positions and (2) the accumulation or stagnation of impure blood in the veins within the abdomen, are both common occurrences in tuberculosis, and are responsible for many diverse and troublesome symptoms. It is often possible, in this event, to obtain relief from a wide variety of stomach and bowel upsets, simply by applying even pressure and support to the abdominal wall. If that portion of the abdomen below the level of the navel is prominent or bulging, this is fair proof that the abdominal organs are no longer in their customary position.*

However, sagging of the organs may exist without the protruding of the abdomen below the navel. The physician sometimes makes the following simple test to ascertain with reasonable accuracy whether or not benefit is to be expected from treatment intended to correct the two conditions just described:

* It should be understood, however, that the position of the abdominal organs is not precisely the same in all persons. Therefore, in the absence of ill effects, support to the merely slightly protruding abdomen is not in order. When symptoms occur, on the other hand, the method is well worthy of trial.

Test: While the patient lies on his back, with the foot of the bed elevated (or a pillow under the hips) to allow the organs to gravitate upward into a more nearly normal position, a fairly wide band of suitable material and width is snugly applied to the lower part of the abdomen—mainly below the level of the navel. To make certain that the binder does not slip upward, strips of adhesive plaster are sometimes used to fasten it to the skin, or tapes are sewn to its lower edge and tied around the thighs.

In other cases, the physician makes use of an extra strong adhesive plaster—known as mole-skin plaster—which is put on in overlapping strips which when completed form an unusually snug and firm, though of course but temporary, sling for the sagging abdomen.

If relief is obtained in either of these ways, a more permanent support is then secured. Whether the support is made to order or purchased ready-made, the patient should be assisted in putting it on the first time by some person experienced in this line of work. The support should be so fitted that an even, moderate pressure is applied, chiefly below the navel, in such a manner that the relaxed abdomen is gently but firmly squeezed upon and comprest in a backward and upward direction, thus pressing the blood out of the overladen blood vessels, and indirectly lifting the organs back into or near their ordinary resting places.

Incidentally, it is worth remembering that a correctly applied abdominal support will relieve some cases of asthenia or weakness, particularly if the weakness or faint feeling develops when one is standing. Odd as it may seem, relief from mental depression or "the blues" is also sometimes obtained.

Some Good and Bad Foods. If disorders of the stomach or bowels (excluding constipation) have re-

cently occurred, or if the stomach is inclined to be sensitive, the rule should be to eat sparingly, if at all, of the following articles, which are apt to be—

Trouble Makers: Pork, veal; salted meats and fish; canned salmon, lobster, crab, sardines; fried foods in general; coarse breads, such as graham, whole wheat, rye, brown; coarse breakfast foods, such as Pettijohn's and Uncle Sam; fresh and hot bread, biscuit; pastry, rich cakes and rich puddings; pancakes and waffles; coarse vegetables, such as cabbage, cauliflower, brussels sprouts, turnips, spinach, kale and other greens; dried beans, corn-on-the-cob and stewed corn (apt to produce much gas); cucumbers, radishes, raw onions, tomatoes, celery, fruits in general (especially raw or over-ripe fruits); melons of all varieties; spices and condiments, including vinegar; stimulating drinks, such as tea, coffee, and alcoholic beverages.

The following foods are in general allowable, tho judgment must be used:

Permissible Foods: Raw or over-done scraped beef; broiled, roasted or well boiled meat or fish; in general, beef, lamb and mutton; fresh, sweet milk, or milk modified along the lines suggested in Lesson X, p. 232; partially digested milk (prepared according to the directions enclosed with peptonizing powder, procurable from any druggist); kumyss, artificially soured milk, buttermilk; junket, cottage cheese, custard, blanc mange; poached and soft boiled eggs (in moderation); stale bread, toast, zwieback; plain cake, if not rich; prepared invalid foods, such as Dennos', Eskay's, Nestle's and Mellin's Food; gruels and light breakfast foods; Cream of Wheat, puffed or flaked wheat, rice or corn; rice, farina, sago, tapioca; baked or mashed potato, squash, peas, carrots, eggplant, beets, stewed onions; prunes, and baked and scraped apples.

NAUSEA AND VOMITING

1. **Dietary Restrictions.** For an acute attack the most important thing is to give the stomach rest and an opportunity for recuperation, by reducing the food intake. If the attack is severe, all food should be stopt temporarily, for one or more meals as may be necessary. The first food partaken of should be light and easily digested, or pre-digested. (See list of permissible articles above.)

If the vomiting recurs frequently, a careful investigation should be made to determine whether or not some offending article or articles cannot be found and eliminated.

Except as noted below in regard to salt water, fluids should be restricted. Very hot or very cold water is usually best tolerated. Sips of ice water or the sucking of small pieces of ice will both relieve thirst and help to soothe the sensitive mucous membrane of the stomach.

In some cases it is helpful to take the meals entirely dry, and to take the fluids, in minimum quantity, an hour before eating.

2. **Rest of the Body.** If up and around, lie down, and if the vomiting is severe or repeated, remain in bed a day or longer.

3. **Attention to the Bowels.** Often constipation is the underlying cause of the stomach distress. When this explanation seems plausible, or even tho it does not, a dose of salts or other saline, or a warm rectal injection, to empty the bowels, will likely go far toward clearing up the difficulty.

4. **Salt Water for Washing Out the Stomach.** Drinking a glass or two of luke-warm salt water is useful in washing out the stomach and in cutting short the attack. The salt water will either be vomited or will

pass on into the bowel, in either event aiding materially in clearing out the irritating food and secretions. Then, too, vomiting is less painful if there is a fair quantity of liquid in the stomach, than when the organ is almost empty. (If it is desired to empty the stomach at once after taking the salt water, vomiting can usually be induced by tickling the throat with the finger.)

5. **A Mustard Plaster** placed over the pit of the stomach (in the angle just beneath the ribs), is an effective measure of relief.

"BILIOUSNESS"

The term "biliousness" covers a multitude of sins, and has a different meaning for different persons. As applied here, biliousness refers to that form of stomach and bowel upset characterized by constipation, nausea and perhaps vomiting, a coated tongue, a general heavy or logy feeling, a full feeling in the head, and perhaps headache.

Treatment. The securing of a free movement of the bowels by suitable means; the omitting of the meals until the bowels are thoroughly unloaded; and keeping to a light diet for a day or so thereafter, is usually all that is necessary. Castor oil, in the dose of one or two ounces, is a very effectual remedy for clearing out the bowels; altho for certain cases, salts or some other form of saline; or, if the constipation is very pronounced and the patient fairly robust, one or two compound cathartic pills may be better. If necessary, a rectal injection may be used to assist in cleansing the bowel.

LOSS OF APPETITE

When the appetite fails, the relish for food may often be regained if care is used to avoid monotony in the menus, and in tastefully preparing and attractively garnishing the food. Here is one place where a good nurse proves her worth. By artfully coaxing or commanding the invalid to eat, by personally feeding him, by preparing tempting dishes, and by adding an occasional appetite invigorator to the bill-of-fare, as well as in divers other ways—she will often turn the scale from failure to success.

If the stomach is in condition to tolerate these articles, the inclusion, now and then, of one or more of the common appetite invigorators (such as those mentioned in Lesson X) in the bill-of-fare, may stimulate the appetite just enough to create a call for articles of greater food value, which may then be eaten and enjoyed. *Caution:* Remember, however, that as a class the appetite invigorators are rather hard on the digestion, and, on the whole, have but small food value.

SOUR STOMACH—BURNING SENSATIONS—HEARTBURN

These symptoms result from the presence in the stomach of (1) *an excessive quantity of the normal acid* (hydrochloric acid, or, as it is sometimes called, muriatic acid), or (2) from *abnormal acids,* formed as the result of food fermentation. *Relief* in both cases is afforded by the taking of some alkali to neutralize the acid. For this purpose a teaspoonful of baking soda, stirred into a glass of water; a teaspoonful of light magnesia; half to one tablespoonful of milk of magnesia; or one teaspoonful of aromatic spirit of ammonia, well diluted with water should be taken at the height of the attack, and if necessary, repeated in two hours. The milk of

magnesia is laxative and, as constipation is often associated with sour stomach, seemingly in part at least, as a cause, magnesia answers both needs. But if a laxative is not wanted, the magnesia in this form should not be taken. Charcoal, in the dose of five to ten grains, is also often of much value.

For merely a temporary attack of acidity, probably no further treatment will be required.

When the condition is long drawn out, however, further measures may be called for, and it should be remembered that the *curative treatment* of the two varieties of excessive acidity are rather opposite. (1) When abnormal acids are responsible, remedies for the purpose of aiding digestion, such as pepsin or hydrochloric acid, are often prescribed by the physician. Preparations of this kind assist Nature in digesting the food promptly, ere it stagnates and undergoes fermentation with the formation of abnormal acids. (2) If an excess of the normal hydrochloric acid is responsible, the taking of anything that increases the acid will, of course, make the condition worse. As it is impossible to tell accurately from the symptoms alone which acid is responsible, in obstinate cases it is often necessary for the physician to have the patient eat one or more special or test meals, to be followed after a fixt interval by the withdrawal and examination of the food.

1. Diet When Abnormal Acids Are Responsible. The food should be light and easily digested (see list of "Permissible Foods" on an earlier page), but no special dietary can be laid down, because quite different articles are prone to undergo fermentation in different stomachs. Experience is the best teacher in this regard.

2. Diet When the Cause Is an Excess of the Normal Acid. The food should be mild and non-irritating. Stimulating food and drink, including condiments,

vinegar, acid fruits, pickles, salt, and alcohol, are to be especially avoided. Starch is to be eaten sparingly, and only in the most easily digested forms, such as stale bread, toast, zwieback, boiled rice, and puffed or flaked rice, wheat or corn, Cream of Wheat, blanc mange, etc. Milk, eggs and meat, and fats and oils such as butter, cream, olive oil, etc., are usually well borne. Moreover, fats and oils sometimes seem to be of direct benefit in lessening the acidity.

In some cases, the diet can be restricted to meat almost alone, to advantage. (Lean meat, which contains a large per cent of protein, requires a large amount of hydrochloric acid for its digestion, and so has a tendency to use up the excessive amount of acid.) It is preferable to eat the meat raw, or at most, cooked only a little. A suitable quantity of minced or grated beef, spread on stale bread, may be taken every three hours.

On the other hand, the very presence of meat in the stomach sometimes seems to induce an even greater secretion of acid than is used up in the digestive process, and so tends to aggravate the condition. Under this circumstance, the alternative plan may be tried of omitting meat entirely, and confining the dietary to milk, an occasional egg or custard, the milder breadstuffs and cereals above indicated, and the fats and oils.

GAS ON THE STOMACH OR BOWELS, WITH OR WITHOUT PAIN

Here again, the regulation of the diet is the first thing to consider. All articles prone to produce gas in the individual case should be eliminated, unless they are vitally necessary. The following are to be especially avoided: Pastries and rich cakes; fried articles; hot baked breads; potatoes (baked potato is ordinarily the least harmful); coarse cereals, vegetables and breads; dried beans of all varieties. In general, the foods listed

as "Trouble Makers" on a previous page are to be eaten sparingly.

A hot compress applied over the stomach or bowels (according to the location of the trouble), for one or two hours, twice daily, is often a great source of comfort. A hot turpentine stupe may be even more effectual.

Caution: If there is known to be trouble with the kidneys, turpentine should be used very guardedly. When making hot applications of any sort during cold weather, care should be used to avoid exposing the abdomen unduly. It is even more important that this precaution should be taken when removing or reapplying the source of heat. It should be remembered that as a result of the artificial warmth, the superficial blood vessels become dilated and engorged with blood, and if a sharp draft of cold air is allowed to strike the abdomen, the blood will be suddenly driven inward, and a new attack may perhaps be precipitated.

When the trouble is chiefly in the bowels, a simple rectal injection of warm salt water or soapsuds, an asafetida enema, or a compound enema (each of which is described near the end of this lesson), is often the quickest and best way to obtain relief. In other instances, especially when the gas has accumulated low down in the bowel, the insertion of a well-greased rubber rectal tube as high as possible, which is then retained for some time, will greatly facilitate the expulsion of the gas.

Medication. When the gas is mainly in the stomach, one-fourth to a teaspoonful of Hoffmann's Anodyne, preferably in *cold* water, repeated if necessary once or twice at intervals of twenty minutes or half an hour; essence of peppermint, 10 to 30 drops, preferably in *hot* water; spirit of camphor, 10 to 30 drops, mixed with a little sugar, then with water—are home remedies of



STRIKING CONTRASTS

On the left is a patient who has been taking daily sun baths for several months. Note the heavy coat of tan. Tanning is an important effect of both the natural and artificial sun baths, and patients who tan well usually receive the greatest benefit. Full instructions for taking the sun bath may be found on pages 282-285. *Photo by courtesy of Dr. H. E. Kirschner, Monrovia, Cal.*



UNDER THE QUARTZ LIGHT (ALPINE SUN LAMP)

Artificial light also has a field in the treatment of tuberculosis. This patient is receiving quartz light radiations, made by passing an electric current through mercury in a vacuum. The light is emitted through a quartz tube and is very similar to sunlight, with certain advantages.



much service. The Hoffmann's Anodyne is especially useful when pain accompanies the gas formation. A combination of equal parts of Hoffmann's Anodyne, aromatic spirit of ammonia, and essence of peppermint—of which one-half a teaspoonful is to be taken in water, is also very efficacious.

For gas on the bowels, five drops of chemically pure turpentine on a lump of sugar,* or a three or five grain pill of asafetida, may be taken three times daily.

DIARRHEA

For an acute attack, the first thing is to omit all food (for one or more meals, at least—perhaps for twenty-four hours) and, if up and about, to go to bed. If the attack has followed the eating of indigestible food, a good dose of castor oil should be taken, provided thorough purging has not already occurred. The primary effect of castor oil is to sweep out the fermenting, irritating material; whereas secondarily, it has a constipating action; so that altogether the effect is doubly valuable. *Note:* If the patient is already weakened from excessive bowel action, the castor oil should not be given. To assist in cleansing the bowel, a warm saline enema, administered very slowly, may be of material help.

The first food eaten should be soft, soothing and easily digested (see articles listed below under *chronic* diarrhea), and the return to solid food later made gradually.

If the diarrhea is *prolonged or chronic,* the careful selection of the dietary along the following lines will often prove curative in the end:—

All spicy and highly seasoned food should be shunned. Tomatoes, cucumbers, radishes, raw onions; coarse foods,

* When there is known to be serious trouble with the kidneys, it is usually inadvisable to administer the turpentine.

such as dried beans of all varieties, cabbage, cauliflower, spinach, kale, celery, and coarse breads; fried foods and pastries—should be banned. Fruit, melons, and pork, should be eaten sparingly, if at all.

Permissible foods include: stale bread, toast, zwieback; boiled milk, condensed milk mixed with water, artificial buttermilk, peptonized or partially predigested milk (prepared by the use of peptonizing powder, procurable of all druggists), chocolate; flour and milk porridge; milk breakfast foods, such as Cream of Wheat, puffed or flaked wheat or rice or corn; boiled rice; custard, blanc mange; poached egg; scraped raw beef, overdone beef; beef juice (not extract of beef). As convalescence proceeds, soups, noodles, macaroni, spaghetti, and baked or mashed potatoes, may be added.

If the diarrhea is intense an effectual mode of treatment is to omit for a few days all food except milk, gruel and zwieback, given every three hours in such quantities as seem to be indicated. Boiled milk, diluted condensed milk, soured milk, or partially digested milk may in some cases be substituted for the sweet milk.

Daily cleansing of the lower bowel with a saline enema, or an enema of starch water, is another useful measure.

A small dose of castor oil (say, a teaspoonful) once daily, over a period of time, for its constipating effect, is often efficacious.

If diarrhea, cramps or abdominal pain have a tendency to recur frequently, it is important to protect the body against chilling. By keeping the cool air from striking the sensitive skin of the abdomen, the constant wearing of a soft woolen abdominal band will in many cases do a great deal toward warding off these distressing attacks.

CONSTIPATION

Too much emphasis cannot be placed on the importance of a regular, normal movement of the bowels. In most cases, this means at least one evacuation daily. One disadvantage of the rest treatment for tuberculosis is its tendency to induce or aggravate constipation (of the *atonic* type—see below). Nevertheless, rest is so essential that ordinarily it should be persisted in, and other measures adopted if necessary for the relief of constipation. Whenever possible, the result should be achieved by natural methods.

The Two Types of Constipation. Before going further it seems well to explain that there are two distinct types of constipation, each of which requires somewhat different treatment.

1. *Atonic* constipation is due to a weakness of the muscular coat of the bowel, so that the fecal mass is not propelled onward as rapidly as it should be. Meanwhile, the moisture is gradually absorbed from the bowel contents, so the characteristic stool of atonic constipation is fairly large in caliber, dry, hard and chunky. The seat of the trouble in this type of constipation is usually low down in the bowel—that is, near the outlet.

2. *Spastic* constipation is due to an uneven, and in places excessive, contraction of the circular muscular fibers in the bowel wall. Here and there this brings about a narrowing of the bowel lumen *ahead* of the fecal mass, so that it is actually held back. Accumulation of gas and abdominal pain and cramps are more commonly associated with this variety of constipation. The typical stool of spastic constipation is rather soft, with a tendency to be narrow and ribbon or tapelike. In spastic constipation the difficulty is apt to be located

higher up in the bowel (farther from the outlet) than in the atonic type.

In relieving constipation of either variety, the first aid is the formation of the habit of going to the toilet at a regular time each day, whether or not there is a desire at this time. Just before or after breakfast is ordinarily the most suitable time, but in other cases some other hour may be better. Needless to add, a call coming at any other time should not be neglected.

The second measure of importance is a proper dietary, which must be regulated in accordance with the prevailing type of constipation. By this means, alone, or combined with other natural methods, the most obstinate constipation of many years standing can often be completely conquered.

DIET FOR CONSTIPATION

Atonic Type.

General Rule: **Avoid highly concentrated foods; eat plentifully of foods that leave a relatively large amount of undigested residue, or "roughage."**

Permissible Articles. Fruits, fresh or cooked; especially, figs (dried or fresh), prunes, and to a less extent, apples, pears, oranges, berries (except blackberries). Coarse breads, such as brown, graham (whole wheat) and rye breads. The coarser cereals, such as rolled oats, Uncle Sam and Pettijohn's Breakfast Food, and in general, breakfast foods containing flaxseed or bran. Coarse green vegetables, including: spinach, kale, mustard and other "greens"; asparagus, string beans, lettuce, artichokes, brussels sprouts, etc. Olive oil or salad oil (cottonseed oil). Buttermilk, or artificially soured milk, in preference to sweet milk.

Most persons drink too little water, so cold water should be drunk freely (unless there be some good reason for not doing so).

Note: Attention should be called to the fact that while the above foods are of much aid in preventing and curing constipation, some of them contain but little nutriment; hence it is necessary to avoid falling into the error of giving so much attention to the relief of constipation that nutrition and energy are slighted. Care should be taken to see that the dietary contains a sufficient quantity of nourishing foods. Bear in mind that it is more important for the sick person to receive sufficient nourishment than it is for the constipation to be controlled by the dietary. If necessary, it is better to resort to artificial means to move the bowels than to restrict the intake of really necessary foods below the safety level.

So, too, many of the articles of food useful in relieving atonic constipation are inclined to irritate the stomach. So when the stomach is sensitive, the rule should be to humor this organ and to approach the treatment of constipation in some other manner.

In severe and long standing cases of atonic constipation, the following simple program will often give excellent results, if not barred by one or more of the factors just mentioned: Eat a dish of stewed prunes, and take one or more tablespoonfuls of bran in water or in any convenient way, at each meal. At bedtime and on arising, drink slowly one or two glasses of cold water. At all meals, eat in addition as many of the other laxative foods as prove practicable.

Spastic Type.

The coarse foods useful in relieving atonic constipation are inclined to aggravate constipation of the spastic type. The following foods are indicated:—

Fruits: pears, peaches, prunes, apricots (not figs). Breads: stale white bread, toast, zwieback. The coarse breads mentioned for atonic constipation are to be

avoided. Cereals: mild, soft breakfast foods, Cream of Wheat, cornmeal mush, puffed or flaked wheat and rice, boiled rice. Avoid coarse cereals. Soft vegetables: peas, carrots, turnips, squash, pumpkin; mashed and baked potato (in moderation); hominy (well chewed). Avoid coarse vegetables. Miscellaneous: honey, marmalades, jellies and jams; olive oil or salad oil (cottonseed oil). Warm or hot water taken liberally (unless otherwise contraindicated). Avoid cold water.

In *atonic* constipation, the object is to eat foods that leave a residue after digestion, which will supply bulk to the fecal mass and mechanically irritate and stimulate the bowel muscle to propel the contents onward. In *spastic* constipation, on the contrary, the aim is to select foods that are not mechanically irritating, the purpose being to soothe the mucous membrane and to allay spasm of the muscular layer of the bowel wall.

Massage of the abdomen is a supplementary measure of considerable value when the atonic form of constipation predominates. When an experienced masseuse is unobtainable, the massage may be given by the nurse or other attendant; or, if the patient is not too ill or weak, he may, if necessary, administer the treatment to himself.

Directions for Giving Abdominal Massage. The patient lies on the back, with the knees bent and thighs elevated to assist in relaxing the abdominal muscles. Breathing slowly and rather deeply through the *mouth* will help in securing relaxation. Warm the hand, if cold, and lay the fingers and perhaps part of the palm flat on the abdomen, near the navel. Begin with a light, circular motion about the navel, gradually widening the area covered to a diameter of say six inches, and, as the massage is continued, progressively increase the pressure, until finally the abdominal wall is prest in

quite deeply and firm pressure is being used. After thus spending a few minutes massaging the central area (over the small bowel), the same plan should be followed in massaging the colon (the large bowel). For this purpose, the massage is started low down on the right side of the abdomen, and, as the hand is moved in rather narrow circles, the massage is progressively continued in a sort of U-shaped curve—upward to the edge of the ribs, then across to the opposite side, and finally downward on the left side to the lower limit of the abdomen. At this point, the pressure should be even deeper and firmer, to reach the backward bend in the bowel known as the sigmoid flexure, where much of the trouble is commonly located. At no time should the motion be violent, nor should the pressure be so intense as to cause pain. The massage should be given daily for fifteen or twenty minutes.

Caution: Massage should not be given in the event of serious complications in the abdomen, such as appendicitis (acute or chronic), nor when tuberculosis of the bowel is present. Likewise, massage is contraindicated when the spastic type of constipation prevails. (As a matter of fact, spastic constipation is likely to be benefited by any measure that affords the bowel comparative rest, and is often relieved by rest in bed.)

In spastic constipation, the application of a hot compress to the abdomen for an hour or two, one to three times daily, is a simple measure of much value.

Treatment for Mixed Types of Constipation. When the two types of constipation are associated, or when they alternate in the same case, as is fairly common, a sort of compromise plan of treatment must be adopted. Also, fortunately, certain measures are serviceable alike in both types. Two such measures are the paraffin oil treatment, and the treatment with agar—either of which

may be administered in conjunction with other measures, and both of which are harmless.

Paraffin oil is a clear, colorless, tasteless and odorless oil, which is not, to any appreciable extent, digested or assimilated, but which serves as a most excellent internal lubricant, aiding also in softening the feces and in general facilitating the passage. The dose is the amount that is needed. No fixt dose can be set, but experiment will determine the proper dose in each case, which can often be reduced after a few weeks or a month or two, and perhaps eventually discontinued entirely. A tablespoonful three times daily is a good beginning dose—later to be increased or reduced as required.

A number of highly purified, excellent paraffin oils are on the market, any of which may be taken. Some of these oils are a little heavier than others; in certain cases the oils with heavier body are more efficient.

Agar, or "vegetable gelatin," a preparation made from a Japanese sea-weed, has the property of absorbing and retaining an unusual amount of water. When eaten, the agar absorbs water and swells, forming a soft, jelly-like substance which serves to keep the bowel contents soft and, like paraffin oil, also serves as a sort of internal lubricant. Practically speaking, agar is not digested or assimilated, so has no food value. Like the oil, agar is absolutely harmless. It is also practically tasteless. For the purpose of relieving or curing constipation, agar is sold in the form of small granular flakes, which can be conveniently sprinkled over breakfast food, eaten dry, or dropt into a little water or milk. Agar should not be cooked. The dose is two teaspoonfuls, more or less, as required, taken three times daily; later increased or diminished as found necessary.

Neither of these preparations has medicinal value, and they are not to be looked upon as ordinary laxatives.

Let it be understood, also, that no immediate effect is to be looked for. However, when agar is taken, the good effect usually begins to show within a week; altho sometimes a longer period is required. As a rule, the oil must be taken longer, in obstinate cases for a month or more, before improvement is noted. By perseverance in the use of one or the other of these preparations, the whole tide of affairs can usually be changed and the habit of taking daily some laxative or purge, which from necessity may have been persisted in for years and years, made unnecessary.

In connection with the oil treatment, in some cases, there is one disagreeable feature—the escape of a certain amount of the oil when passing gas. This is sometimes an indication that too much oil is being taken. Again, it may result from taking all of the oil at one large dose, as at bedtime, instead of distributing it in three smaller doses throughout the day. In still other instances, the difficulty is due to the use of an oil having too light a body; in this event, the leakage may be controlled by procuring a heavier oil. In some cases, this annoying feature continues despite all precautions. When this is true, if the oil and agar treatments are combined (if both preparations are taken) the leakage will nearly always cease. Moreover, the combined oil-and-agar treatments seem to have a better effect in certain cases than either alone.

Oil enemas, retained over night, are also of much value in both types of constipation. In giving the oil enema, the patient lies on his left side with hips slightly elevated, while from one to five ounces of warm oil (olive oil, salad oil, or paraffin oil) is allowed to run slowly into the bowel. One ounce is a suitable dose at first; this may gradually be increased to four or five ounces. At first the treatments are to be administered every night.

Later, with improvement, the interval should be gradually lengthened to a week or longer, and the amount of oil progressively reduced. If found necessary, a pad may be worn to avoid soiling the night clothing. A fountain syringe may be used for administering the oil, but as the oil has a tendency to glue the sides of the rubber bag together, it is better to use a metal container, or to detach the tube from the bag and connect it with a funnel into which the oil is slowly poured. If administered by the nurse, a soft rubber rectal tube may be substituted for the ordinary hard rubber tip, and inserted a number of inches into the rectum. This has a certain advantage, in that it allows the oil to enter the bowel at a higher level.

Dilatation of the rectum is yet another valuable measure in both types of constipation. For home use, a set of rectal dilators made of hard rubber or other material may be procured. In their use, the small dilator is first greased, gently inserted, and allowed to remain for say five minutes. Thereafter, the next size dilator may be inserted. Perhaps it may be necessary to persist in using one size for several days or even weeks, ere it becomes practicable to insert the next larger dilator.

Medication. Medicines for constipation are, at times, the lesser of two evils. When this is true, some gently acting preparation, such as cascara, compound licorice powder, A. B. S. and C. tablets, or Phenolax wafers, taken at bedtime, will usually serve the purpose.

Occasionally, in case a large amount of fecal material has accumulated in the bowels, which it is desirable to remove at once, stronger medication may be needed. In this event, one or more doses of salts (or other saline), of castor oil, or one or more compound cathartic pills, may be given. Under no circumstances should the compound cathartic pills be taken for more than three days

in succession. In lieu of these preparations, some form of enema (rectal injection, for which see "Household Measures" later in this lesson) may be used. *Note:* It is usually a poor plan to continue the injections day after day, and week after week. If this is unavoidable, the amount of fluid in the enema should be as small as practicable, to avoid unduly stretching and weakening the bowel muscle.

The insertion of a glycerin suppository at the time when a movement would naturally be expected, may bring on an evacuation and aid in the formation of a regular habit. The habitual use of suppositories should be avoided.

In certain cases, the application of continuous pressure and support to the abdomen (as described near the beginning of this section on stomach and bowel disturbances), will materially assist the normal functioning of the bowel.

SLEEPLESSNESS

Insomnia, or loss of sleep, is an annoying feature in many cases of tuberculosis. In most cases, however, by careful attention to apparently trifling points in the health regimen, the sleeplessness can be controlled without resort to drugs. Fortunately, too, because bad air is back of many a night of broken rest, persons prone to wakefulness often experience profound relief almost at once on taking up the open-air life in earnest.

General Measures for Relief. Stomach and bowel disturbances, accompanied by delayed digestion and gas formation, are frequently provocative of restless, tossing nights. So a good general rule is to take a comparatively light evening meal, and to eat it rather early. All foods prone to produce gas should be avoided at all times, but especially at this meal. Constipation, if pres-

ent, should be conquered. Relief of constipation, alone, has served to cure many an obstinate and protracted case of insomnia. (For details of treatment of these conditions, the reader is referred to the appropriate pages in this lesson.) Ordinary coffee and tea should be abstained from, especially after mid-day. (For confirmed users of coffee, one of the de-caffeinized preparations of genuine coffee; or, again, a coffee substitute, such as those mentioned under the caption "Beverages," in Lesson X, may be used.)

Attention given to the following apparently negligible matters will probably be of help: (1) The use of a high pillow, or the semi-sitting position. This posture serves to lessen the amount of blood in the brain and to quiet mental activity. (2) The moonlight or other light should not be allowed to shine in the eyes. A screen of some sort can usually be arranged to obviate this difficulty, or a black band may be worn over the eyes. (3) The bed clothing should be as light as is consistent with comfort. Both chilliness and excessive warmth are to be avoided. (4) In suitable cases, a hot bath; a warm sponge; or a hot footbath, to which mustard may be added—taken at bedtime, will prove of much value. During cold weather, due caution to avoid the acquirement of a cold must be taken, and it may prove best to omit the hot bath at this time (the more so, because most persons sleep best during cold weather). If cold feet provoke wakefulness, some form of foot warmer—to be dispensed with as soon as possible—may prove a sovereign remedy. (5) Massage of the whole body (with care in manipulating the chest muscles) is another valuable measure. (6) If sleeping during the day interferes with rest at night, it may be well to avoid sleep during the afternoon rest hour.

Importance of Correcting the Mental Attitude. Very

pronounced cases of insomnia can be relieved by the formation of healthy habits of thought. Just as sleeplessness is initiated or made worse by brooding and worry, by fear and joy—by mental excitement of any nature—so the correction of these faulty habits by careful daily training of the mind will, in many cases, cut the bonds that hold one from sleep.

First of all, try hard to make up your mind that you *will* go to sleep. Even more important: Make up your mind that if you do not go to sleep promptly, or if you are disturbed by repeated periods of wakefulness, or half-wakeful states, and distressing dreams—that you will not worry because you do not sleep. Remember that persons who are constantly at rest do not require as much sleep as if they were up and around. Of course it is best for everyone to obtain his or her full quota of refreshing sleep (tho all do not require the same amount); but remember that one can get along *and get well,* despite the fact that for years and years, one gets astonishingly little sleep. If when seeking sleep, you will resolve firmly that if you later find yourself awake, you will not worry and brood over the fact that because you are losing sleep, you are wasting valuable time; if you will renew this resolution each night, the first thing you know, you will be pleasurably surprized to find yourself sleeping much better. Also, in this connection, it may pay you to read the little books by Dr. George Lincoln Walton, entitled "Why Worry?," "Those Nerves" and "Peg Along."

Another thing: Make it a plan to put out the lights at a regular time and to seek sleep promptly. This plan should be adopted when the other regulations for recovery are first put into effect, and zealously adhered to thereafter. Regularity in habits means a great deal; therefore in most cases it is unwise to continue reading

at night in the hope that one will grow sleepy. Do not put off adopting this plan, but put it into effect at the beginning. It is much easier to make the break completely and at once: easier to get out of all the old ruts at one and the same time. However, if you have not previously adopted the motto, *lights out and to sleep* at a set time each night, adopt this motto now. It is one habit that will do you good.

Third: Avoid taking your troubles to bed with you. Resolve that you will put them from you. If they persist in revolving through your mind, fix you attention on some pleasurable experience you have had in the past. Or, if you have noticed that you sleep better when it is raining, as many do, just imagine that you are listening to the steady drone of rain on the roof. If the distressing thought recurs, cast it aside again. Do not feel concerned because you do not immediately succeed in putting it from you, once and for all. Bear in mind that this experience is a common one, in no wise peculiar to you; that thousands of others have gone through the same distressing period when it seemed that they could not conquer the persistently intruding thoughts. Yet in the end, they have won. If you will consistently persevere in this attitude toward distressing memories and unwelcome thoughts, night after night, you will eventually be rewarded by a night of refreshing sleep. Keep on—and your triumph will become complete.

Fourth: Do not attempt to settle business matters or other problems at night. The chance is small that you will succeed in settling properly at night a matter that you were unable to settle during the day, when you were wide awake and thinking clearly. Make it a plan, never to take up after three in the afternoon anything that tends to excite the mind. If there is some matter that

can be settled by giving a little time and attention to it during the day, and if it is at all possible for you to do so without harming yourself materially, just interrupt your rest program for a day to be given over to the satisfactory settling of the problem. Then, with the difficulty ended and your mind freed of its load, you will be in condition to gain full value from the rest regimen.

Fifth: In obstinate cases of insomnia, a change of environment or scene may prove of benefit. This is the more likely if you are dissatisfied with any particular feature of your present surroundings. If discontent causes persistent unhappiness, or if you are continually at swords-points with those around you, the first thing is to see if the fault is not your own. Remember that it does no good to bemoan your fate. This serves only to hold you back, and is fair neither to yourself nor to others. Don't be a grumbler. Make up your mind that you *will* see the bright side. It is almost never so dark that there is not light somewhere, if you will but look in the right direction. Try your utmost to get in harmony with your surroundings, in tune with those around you. If you find yourself unable to do so, and getting more and more dissatisfied, do not decide that you are doomed to fail, but make up your mind that you will surmount all obstacles, and that you are *going to win.* Of course, if your condition and other factors permit you to change your abode, and if you can find some new scene and surroundings where the general atmosphere is congenial, then you should make the change. But if you cannot, steel yourself to win, anyway.

The Question of Climate. In obstinate cases of insomnia, the effect of climate may be worth considering. In the lesson on climate attention has been drawn to the fact that for some persons high altitudes have a

tendency to induce or aggravate nervousness, to cause restlessness and to provoke wakeful nights. On the other hand, hot weather often begets sleeplessness, and a change from a warm climate to the cool, refreshing nights at a higher altitude not rarely brings prompt relief. Restless nights are also common in localities where the air is very dry and surcharged with electricity, especially if strong winds prevail. A change to a lower altitude; or, if living in a hot climate, perhaps to a higher altitude, or to some point where the air is cooler; or if the atmosphere is inordinately dry, to some locality where the air is slightly moister, perhaps may prove wise. In no circumstance, however, should the decision be based on one factor alone, but only on a careful balancing of all elements in the case. Also, before deciding definitely on a change, the most careful attention should be given to Lesson XII, especially to the sections dealing with the question of advisability of climate change, rules for making the journey, and warning against the wanderlust.

Other Helps. If you are accustomed to turning over frequently and thrashing about in bed, try this: On putting the light out, lie in one position for a long time, force yourself to remain in this position until it becomes almost unbearable; retain this same attitude still a little longer, then turn and seek a more comfortable position. Sleep will often follow. The same procedure may often be adopted during a wakeful period in the middle of the night.

If your condition permits of your sitting up a little each day, it may be helpful for you to take all or part of this allowance just before seeking sleep. If you are allowed to walk, a short stroll at this time may prove beneficial.

In case the insomnia is very pronounced, it may perhaps be advantageous for you to move about a little

more than you would otherwise allow yourself. If your condition as a whole seems to demand absolute rest, still under the circumstances it may prove best for you to step over the line just a little. For example, try sitting up for a quarter or half an hour before bedtime. Either of these procedures will tire you a little, so sleep may come more naturally.

In some cases sleeplessness seems to be due to a craving of the stomach for food* (a craving which the patient may or may not be aware of) and a hot drink of milk or chocolate or other light lunch, taken at bedtime or during the wakeful period, may aid in withdrawing blood from the overworked brain or allay the sensation of hunger sometimes responsible for the absence of sleep, and serve to draw a curtain over the mind's activities.

Medication. When simpler means fail, it is sometimes necessary to induce sleep by suitable medication, but no drug for this purpose should be taken except when prescribed by one's personal physician, and in all cases, its use is to be discontinued as soon as possible.

NERVOUSNESS

For the general restlessness and "nervousness" associated with many cases of tuberculosis, there is, on the whole, no remedy so valuable as rest in the open air. There are, of course, exceptions to this rule, but for the average patient troubled with an attack of "nerves," who is sure he cannot rest and relax, rest is really the very thing that will soothe and tune down the high-strung nerves most quickly.

Nevertheless, cases occasionally arise wherein the

* Craving for food or a gnawing or burning sensation is sometimes due to excessive stomach acidity, and a teaspoonful of baking soda in water or other appropriate treatment (see p. 373) may cure the insomnia.

opposite effect is manifested. Here, the taking up of some harmless pastime, or the cultivation of a hobby, will often do much toward preventing time from becoming a drag, and make the "taking of the cure" an easier, more pleasant matter.

The taking of the cold sponge-bath each day, faithfully, is a simple but unmistakably valuable procedure for soothing and quieting the overwrought nerves. If one is able to be up and about, the "drip sheet," another form of cold bath, may perhaps be better in the given case. Full directions for employing cold in either manner may be found in Lesson XV.

If, however, despite the use of such measures, the restlessness is very persistent and pronounced, a slight deviation from the rest program may be permissible, but should only be undertaken after carefully estimating all of the pros and cons. Finally, a change of environment or climate may be sought; concerning which the same remarks apply as in the case of sleeplessness.

Household Remedies and Measures

The following remedies may be safely taken without further instructions than those given herein (or on the package), and may fittingly occupy a place on the family medicine shelf:

Hoffmann's Anodyne. For pain in the stomach; gas on the stomach; for hiccough; and as a rapid stimulant in case of weakness, faintness or heart failure. Dose: one-fourth to two teaspoonfuls, preferably in *cold* water.

Aromatic spirit of ammonia. For the quick relief of weakness, faintness or heart failure; for sour stomach. Dose: the same as for Hoffmann's Anodyne. If a small dose (say one-fourth or one-half teaspoonful) of either of these remedies is taken, this may be repeated several times at fifteen-minute intervals.

Essence of peppermint. For sour stomach, gas on the stomach, and mild stomach pain; also useful as a gargle for relieving throat distress and irritating cough. Dose: ten to thirty drops preferably in *hot* water, repeated a few times at intervals of a quarter or half an hour, if required.

Spirit of camphor. For gas on the stomach and mild stomach pain; hiccoughs; and as a mild nerve sedative. Dose: ten to thirty drops, mixed first with a little sugar, then with water; may be repeated at intervals of a quarter or half hour.

Compound tincture of benzoin. For relieving irritation of the throat, to quiet an excessive cough, for an acute cold on the chest. Directions: Place a teaspoonful to a tablespoonful in a pint of boiling water, and inhale the steam for twenty minutes several times daily. Avoid exposure to cold air for at least a half hour afterward.

Benzoin is also useful for painting cracked lips and nipples, chapped hands, etc.; for sealing up small cuts and abrasions, and the like.

Turpentine (chemically pure). For the relief of throat distress and cough; for acute cold on the chest: used in the same manner as benzoin. Internally: for intestinal fermentation and gas formation. Dose: five to ten drops on a lump of sugar, three or four times daily. CAUTION: Not to be taken in case of known kidney disturbance.

Asafetida. For gas on the bowels; also sometimes of service in allaying nervousness. Dose: three to five grains in pill form three or four times daily.

Aspirin. For relieving sundry aches and pains, headache, etc.; for lowering fever, and by allaying these symptoms, indirectly promoting rest and sleep. Usual dose: a five grain tablet, followed by a half glass of water, repeated at three-hour intervals if necessary. A

half tablet may suffice. CAUTION: Remember that aspirin merely gives relief, that it has detrimental as well as good effects, and that it is to be taken only occasionally.

Iodin. Counterirritant, antiseptic, etc. For the relief of pleurisy and other painful conditions, including muscular aches and pains, neuritis; for irritative cough and throat symptoms, etc. Directions: Paint a thin coat over the seat of pain. For throat distress and cough paint on sides and front of neck; do not paint the throat itself unless so instructed by physician. If the skin is found not to be sensitive, two or more coats may be applied on subsequent applications, if desired. Use every day or two, if required and the condition of the skin permits.

"New Skin"—flexible collodion. Useful in protecting the skin from breaking as the result of continued pressure, particularly over bony prominences. When in any such place the skin becomes angry and reddened, place a circular wisp of cotton over the area, and paint over with either flexible collodion, or "New Skin." NOTE: The taking of pains to see that the very ill invalid does not rest too long in one position; especially on the hip or other parts where the bones are prominent; the use of a circular rubber water pad, a pneumatic rubber pad, or a home-made O-shaped pillow; the daily careful massaging or rubbing of the body as a whole, giving particular, tho very gentle attention to all such parts—to enliven the circulation—will obviate most bed sores.

Preparation for keeping the skin healthy. Powdered alum, one teaspoonful, alcohol and sweet oil, each one half pint. Shake well before using. Useful for rubbing the skin daily, and for preventing bed sores.

ENEMAS OR RECTAL INJECTIONS

All injections are preferably administered by gravity (with a fountain syringe or enema can), and the solution should be warm and allowed to flow in slowly (ten or fifteen minutes being consumed in the operation) while the patient rests reclining. The entrance of the fluid to the higher parts of the bowels is usually facilitated by lying on the left side with the hips elevated. If the condition of the patient permits, later assuming the prone position for a few moments, then rolling clear over onto the right side, and finally resting on the back is sometimes advantageous. One pint to two quarts of [illegible] is usually sufficient. If possible, this should be retained ten to twenty minutes.

The Salt or Saline Enema. Prepared by adding a teaspoonful of table salt to each pint of water. For the relief of constipation when a stronger enema is not required. Also for cleansing the bowels during diarrhea, to relieve gas pains, etc.

The Soapsuds Enema. As its name implies, this enema is prepared by dissolving a greater or less quantity of soap in water. For constipation, when more assistance is needed.

The Compound Enema. Two teaspoonfuls to one ounce of turpentine, one ounce of epsom salts, and one ounce of glycerin, are mixed with one quart of water as hot as can comfortably be borne. For constipation when still greater stimulation of the bowels is required; to aid in the expulsion of gas from the bowels.

Asafetida Enema. Made by adding two to six ounces of "milk of asafetida" (obtainable at the druggist's) to a convenient quantity of water. Very useful for cleansing the bowel and for the relief of pain and discomfort from gaseous distention.

COMPRESSES AND STUPES

The Cold Compress. Made by wringing out a piece of flannel in cold or ice-water, placing on the desired spot, and covering with a little larger piece of dry flannel or oiled silk. CAUTION: Care should be taken to see that the wet cloth is thoroughly covered, so that air cannot enter around the edges. For the relief of irritating cough, hoarseness, pain in the throat, pleurisy, etc.

The Hot Compress. Made in the same manner, but with very hot water. The compress should be applied as hot as can possibly be borne without burning. CAUTION: In applying, and especially in removing the compress, care should be taken to avoid undue exposure. For pleurisy and pain in the chest, abdominal pain and cramps, gas on the bowels, etc.

Turpentine Stupes (or fomentations). Prepared in the same manner as the hot compress, after which thirty drops of turpentine is immediately sprinkled on the hot, steaming cloth. CAUTION: Not to be used in case of known, genuine kidney disturbance. For abdominal pain, gas on the bowels, etc.

The Mustard Plaster. Prepared by mixing mustard and flour into a paste with warm water, and spreading onto old linen. A thin piece of gauze or muslin should be placed between the mustard and the skin. The plaster should be allowed to remain on only until the skin is thoroughly reddened, which usually means for fifteen minutes or so. For pleurisy, "cold on the chest," for nausea and vomiting (applied over the pit of the stomach); for the relief of pain in the abdomen (applied over the painful area).

GENERAL MASSAGE

Massage of the body of the bed patient contributes greatly to his comfort, and is useful in promoting sleep and the general well-being.

With the patient lying on his back and at ease, while the muscles are thoroughly relaxed, the attendant gently, but firmly, picks up and squeezes or kneads the individual bundles of muscles or muscle-groups throughout the body, passing in a systematic manner from one part to the other. This is followed by gentle friction of the surface with the fingers and palms, at first very light, then firmer and firmer. When rubbing the extremities, the movement should be made toward the heart, in order to aid the return of the impure blood. Placing the palms of the hands near together, and then tapping the body with rapid, vertical strokes made with the side of each hand alternately, is a useful variation. Finally, in suitable cases, the attendant may flex or bend back and forth the various joints of the extremities (passive motion). CAUTION: Throughout the treatment, extraordinary care should be used not to use too much force or pressure in massaging the skin or muscles of the chest. Also, passive motion is not to be used on very ill or very weak patients. All massage is, of course, to be eschewed at times of hemorrhage.

If desired, cocoa butter or some other emollient may be used to render the skin more flexible. Note, however, that contrary to a popular opinion, cocoa butter, applied in this manner, has no practical value as a food.

LESSON XIV

WHEN "BLUE" DAYS COME

PRICELESS as it is, in helping to restore the pulmonary invalid to a life of usefulness, rest, like all other beneficial measures, has its objectionable features. Rest makes it necessary for the patient to be more or less isolated from the affairs of the world, so he is called upon to find some other way in which to occupy his time. With but few persons to converse with when taking the "cure," it is natural to spend a good many moments in communing with oneself. For most persons, time whiled away in this manner is harmlessly spent in day-dreaming and building air-castles for the future. Others, however, are prone to convert the idle hours into mischief—to waste their energies in moodily pondering and brooding, in anxiously looking forward to misfortune, and in general, in building up house after house of worry and discontent.

PREVENTIVES AND ANTIDOTES FOR FEAR AND DREAD

Here then, it may be well to take up one by one the common causes for anxiety and, by careful investigation and analysis, see if we cannot devise effective preventives and antidotes for the dragons of gloom and worry. Before doing so, however, it may be well to give a moment to asking a question or two, the answers to which will help to keep up your courage and hope until the antidote takes full effect.

A Significant Incident. Do you not recall some day when even the most simple, commonplace matters ap-

peared to have suddenly acquired the faculty of twisting themselves into the most knotty, insolvable problems? Do you recollect how at night you have lain awake for hours trying to reason the thing out, and how the longer you reflected on the matter, the more tangled and jumbled it became? How immediately following each momentarily cheering thought difficulties presented themselves so rapidly and continuously that finally a dark mantle of gloom and despair settled down upon you, and you became certain that there was no way out!

Yet after all, how when the shadows of night were at last lifted and the sun came out in its full glory, at once the mist cleared from your brain, and gloom and despair were displaced by a wonderful feeling of renewed confidence and happiness? How on looking back on the long black night, you wondered what could have given you so despondent a turn of mind, and laughed at the imaginary bogy you had conjured up for yourself?

No doubt you have had this experience. Do not forget it. Some day when you strike a bad spot on the road to health; when deep in your heart you feel that you are going to mire down right there for good, just recall this incident, and you will see that matters are not so serious as they appear.

No Cause for Alarm Merely Because One Grows Worse for a While. Returning to the preventives and antidotes, we shall begin by assuming that before taking up the "cure" you had been losing weight quite rapidly and on the whole going from bad to worse. If this is true, there is no need to be disappointed if you do not begin to pick up immediately, or even if for a time you continue to fail.

Just think of yourself as being in an automobile that has temporarily gotten out of control and is racing down a steep hill. Picture yourself as endeavoring to

check and stop the speeding machine, so that you can turn round and go up the hill again. In doing so, it will first be necessary for you to slow down gradually and to bring the machine to a full and complete stop, ere you can turn it around and slowly reclimb the grade.

So, if you have lost control of your health and find yourself going faster and faster on the down grade, if you will keep a stiff upper lip and a firm grip on the wheel, the chance is large that you will regain control. Bear in mind, however, that, notwithstanding all efforts, you will continue going downward for some time. A gradual slowing up of the downward course is the best that is to be expected for quite a period; later, after a stationary point has been reached you will begin to gain in weight and strength, realizing, as improvement thus becomes evident, that you have really been on the mend for some time.

Do Not Worry Because You Have Always Been Thin and Frail: This May Even Be a Point in Your Favor. Are you apprehensive because you have been thin and frail as far back as memory carries you? If so, then bear this in mind: As a matter of fact, this may be a point in your favor. Altho you have heretofore been going about your daily affairs perhaps wholly oblivious of the fact that something has all the time been holding you back, keeping you always behind the vanguard, nevertheless the likelihood is large that for years, perhaps since earliest childhood, somewhere in your body you have been harboring a hidden, more or less dormant, focus of tuberculosis. Assuming this to be true, the very fact that the disease has not gotten the better of you long ago is strong proof that you have considerable resistance against it. Now that the condition has been recognized and you have settled down to the business of freeing yourself of the encumbrance, this resistance

will prove of much aid to you in throwing off the handicap. Once rid of the burden for all time, you will then be in position to take your rightful place in affairs, and get out of life a keen enjoyment which you had not dreamed had existence before.

The Bogy of Heredity. Are you worrying because several members of your family before you have died of tuberculosis; feeling, therefore, that you, too, are marked out to fail? Have you said to yourself: "If I am predestined to lose, why take up the fight at all?"—Then remember that in all likelihood a careful inquiry will bring to light a definite and sufficient reason why those dear to you failed to attain victory. You are almost sure to find that one or more mistakes were made somewhere; pitfalls which you, by plainly visualizing them in advance, can easily avoid. Remember, too, that at the worst, the inherited soil is almost never so fertile that by right methods it cannot be rendered unfit for the growth of the seeds.

Past Failures Do Not Presage Present Failure. Or perhaps you, yourself, have made one or many previous attempts to win back your health, but have so far failed to achieve permanent success. Perhaps you are beginning to think: "Yes, I can be patched up for awhile, but then I will break down again; so what is the use of trying, anyway? I might as well give up now and have done with it!"

No. By no means give up the fight! Perhaps you have been following the wrong road. Perhaps you have not been consistent in your efforts, concentrating your attention always on the one object. Perhaps you have wavered in your course from time to time and have slipt back a little. Or again, tho you may have so far kept bravely on the right road, may it not be that you have been in too much of a hurry; that you have not correctly

calculated the time element? Remember, that even tho right methods are consistently followed, time is a highly important factor. For example: Many to whom the prize seems unattainable at the end of six months, win in a year; many who give up after spending a year apparently going hopelessly downward, could win in two or three years; still others, finding after two or three years the thread of life growing ever thinner, and concluding that it is useless to continue the struggle, could win by bravely pushing onward a year or two longer.

Voyage of Health Often Rough. Now, before setting sail on your voyage for health, just assume that at some point in your course you are going to strike rough weather. That perhaps even when least expected a storm will suddenly spring up from nowhere—apparently for no reason at all. Be prepared to face more than one spell of this sort without flinching. Remember, too, that each spell may differ radically from the one that preceded it—that no two storms on the ocean are exactly alike. But whatever the exact nature of the storm, it will probably upset your calculations and lead you to fear the worst. Yet after the wind has blown itself out, you will probably find that the interruption to your progress has not been serious. More: To your intense surprise and keen gratification, you may even discover that the stormy symptoms were largely camouflage, and that they drew and held your attention so firmly that you did not notice that you were still making headway—that your improvement was really going forward all the time.

Odd Signs and Accompaniments of Healing

Improvement Sometimes Comes Cloaked in Disguise; so, if some day, out of a calm and untroubled sea, your

fever should begin to rise, with or without an increase in the cough and expectoration, do not hastily jump to the conclusion that you must have gotten off your course and are going backward. Just remind yourself of the fact that one must sometimes first grow worse in order to get better; then carefully think over the following explanation and see if it does not fit your case.

Fever an Indication That Nature Is at Work. When tuberculosis attacks the lungs, to aid in repairing the damage Nature sends an increased quantity of blood, carrying healing elements and reparative material, to the seat of trouble. Thus a sort of inflammation of the damaged area is brought about, the result being that healing is stimulated. Inflammation, of course, is accompanied by the production of heat, so it is not unnatural that the bodily temperature should become higher at this time. Other reasons why fever is sometimes associated with healing in the lungs are discussed in Lesson IV and Lesson VIII. Here it may be well to view the matter from still another angle.

Healing Brought About by the Separation of the Damaged from the Sound Tissue. Once any part of the lung has been irretrievably damaged, healing is brought about by the gradual separation of the damaged from the relatively sound tissue, by a process of softening and liquefaction. Just as a boil softens and "comes to a head," so the tubercles gradually break down and "ripen"—though much more slowly. During this time the bodily temperature is likely to be higher, and in due course, the cough and expectoration, by means of which the softened "core" is little by little expelled, will probably become more marked, weight may be lost—and in general, one may feel quite ill and discouraged. Sooner or later, however, as the period of house-cleaning draws to an end, the distressing symptoms gradually and

progressively subside. Then, with the work of healing and repair just so much further along, one is in position to begin the storing up of energy and strength to make up for the amount expended in the process of elimination and repair.

Nature Does Not Always Complete Her Work at One Long, Tedious Sitting. Bear in mind, too, that Nature does not always finish the task of casting off the damaged tissue, nor complete her repair work, at one long, drawn-out "sitting." The reason why this is so is not always the same; nor can an altogether satisfactory explanation be given in every instance. For the present, however, let us think of Nature as a wise and skilled dentist, guided in her work by her estimate of the strength and endurance of her patient. When one has teeth that need attention, the dentist knows that it is better not to put too big a strain upon his patient at one time. If the job is tedious and hard, he does not attempt to complete it in one, or even in two or three visits, but has his patient return at intervals from time to time, at each appointment carrying the repair work a little further, till finally the day arrives when the finishing touches are added.

Sometimes it seems that Nature is governed by just such reasoning; at any rate, the effect is the same. From time to time, in certain cases, there comes a periodical recurrence or increase of the fever, accompanied or followed by an increase in the cough and expectoration; in turn there comes an interval during which the fever is low or absent and the cough and discharge diminished. This interrupted, wave-like character of the clearing-out-reparative process is in many cases distinctly conservative and favorable—the rest periods between each little up-wave, so to speak, giving opportunity for the building-up of a reserve of energy, which is again drawn

upon at the next "sitting." Thus as the symptoms fluctuate first up, then down, with each oscillation, the time for the dawning of the day of complete emancipation draws nearer and nearer.

Healing Pains. In certain cases it is a strange fact that as convalescence approaches, annoying aches and pains in the chest or elsewhere become quite troublesome or are noted for the first time. The pain is sometimes referred to the neck or shoulders, or down one or both arms; and may be attributed to rheumatism. As a rule, the pain or ache is not severe, but coming just at this time, is apt to be a source of worry and discontent; for very naturally, it is rather difficult to reconcile increasing discomfort with improvement. Such pains, often spoken of as "healing pains," or again, as "weather pains"—because it is common knowledge that they are influenced by atmospheric changes—by no means occur in all cases, but if they do occur, need cause no alarm.

Have you not read of some person who, after an operation for the removal of his appendix, continued to suffer from pain—pain which was so persistent and severe that he finally came to the conclusion that his appendix had not been removed, and that he was still suffering from appendicitis? This sort of pain, and the pains and aches in the chest and nearby parts becoming especially evident as the lungs are healing, are due to similar causes—to the formation of healing tissue (scars) and protective adhesions or bands, which, like scars in all situations, soon begin to shrink and contract, pulling upon and pinching the sensitive nerve filaments within their reach.

The scars in the lungs ordinarily require two or three years to become thoroughly cemented and set. So, if pains recur or continue during this period or longer,

this is merely to be accepted as Nature's friendly warning that reasonable care is still necessary.

An Example of Nature's Foresight and Generosity. Now suppose that you are concerned over a still different matter. We shall assume that, for months or years, you have raised so large an amount of sputum that you have at last become convinced that you are losing the greater part of your lungs. If this has been your thought, just stop a moment and reflect on the fact that by far the larger part of the solid portion of the sputum consists of the so-called white corpuscles of the blood (Nature's soldiers—described in Lesson IV), many of which are dead or hopelessly crippled, and therefore of no further use in the fight against the germs. The great bulk of the sputum, then, consists of these dead or injured corpuscles, carrying within them a greater or less number of tubercle germs, which are in this manner eliminated from the body. Only on rare occasions does the sputum contain even the most minute shred of lung tissue. If you will think a moment, and recall how, when you have had a severe cold in the head, an immense quantity of discharge poured from your nose day after day, yet afterward your nose was apparently as good as ever, you will see that the same rule applies in the present instance, and that you have probably borrowed trouble unnecessarily.

On the other hand, for the sake of argument, let it be taken for granted that you really have lost a large part of one or both lungs. Under this circumstance, while passing through what seems to be an interminable siege of sickness, some such thoughts as the following may linger insistently in your mind: "Yes, I may possibly come out of this some day: but will anything be left of me? What if the fire in my lungs does at last burn itself out? I fear that it will then be too late; for will

I be worth anything either to the world or myself?"

Fortunately, Nature herself has answered your questions in advance. For Nature has generously endowed our bodies with a superabundance of lung tissue, so that it is possible for us to live on as little as one-sixth of a lung. Remember, too, that as time goes on, the sound portions of the lungs enlarge and to a certain extent take on the duty of the air cells that have been put out of commission. For these reasons, once the disease has been thoroughly conquered, unless its ravages have been wide indeed, there will be plenty of healthy cells left for the satisfactory carrying on of the respiratory functions.

A Severe Case of the "Blues"

But suppose your case of despondency is very aggravated and persistent. Suppose that day after day and month after month you have been continually thinking the same thoughts, futilely trying to solve the same problems, till you have gotten into so deep a mental rut that it seems that you will never be able to get out. Each day you have dwelt on your symptoms anew, have threshed the matter out till you thought it was settled; yet a little later the whole thing has come back to you in a worse jumble than ever. Now you find yourself worrying about every conceivable thing. It matters not whether the thing is worthy of attention or thought. It matters not that you yourself well know that there is absolutely no cause for anxiety; the fact remains that you have somehow contracted the habit of brooding.

Up to the present, moreover, despite your most earnest efforts to break the habit, you have been unsuccessful.

If for an instant you obtain a glimpse of the sunshine of hope, almost simultaneously a dark cloud of gloom sweeps over and obscures the light. Nothing seems to go

right, and you see only the dark side of each and every occurrence.

Nor is it always yourself about whom you are concerned. It may be the welfare of your dear ones, or of some friend: it may be some business anxiety. It may be both. It may be some very trivial incident in the carrying on of some little detail of conversation; of letter writing; or in the transaction of some necessary item of business (and remember that the transaction of any item of business not absolutely necessary is strictly against the rules) you feel that you have failed to handle the matter in the most judicious manner; it may be that you feel you are a little lax in some duty, or on the contrary you may feel that you were a little too severe in your dealings with this or that problem. Or, again, it may be that you are not satisfied with the way someone else tends to the duties that ordinarily devolve on you, while you are incapacitated. Perhaps the maid fails to keep things looking tidy and neat; perhaps the food is not cooked just right; perhaps the gardener has become a slacker. And so you feel that things are generally "going to the dogs" and worry because you cannot get up and boss the job. So whatever the cause, you continue to worry.

If someone tries to comfort you, and points out what to him appears to be an error in your point of view, you are inclined at first to agree with him; then you end the sentence by adding an "if—" or a "but—." Thenceforth you relapse into argument to support your pessimistic outlook. Each time that the bright side is presented to you, you have a ready answer upholding your own darker views.

You may even become suspicious of your friends, and finally arrive at the conclusion that they are simply trying to bolster your feelings and cheer you up, irre-

spective of what they really think. You are convinced that their real feeling is that there is no chance for you. You become doubtful and suspicious of everyone—even of yourself. You are now reaching the point where you hardly know what to make of yourself. You are no longer sure of anything. You may even begin to wonder whether you are not losing control of your mental faculties; thinking perhaps, "If, on top of it all, my mind deserts me, what possible chance will I have?"—continuing to carry on the discourse with yourself somewhat on this order: "Worry has been destroying my rest at night and in a thousand ways sapping my meager fund of strength and energy. To have wasted this much time and energy through brooding and worrying, and, in turn, worrying again just because I worry, is bad enough; for so long as worry is unconquered I don't see how it is possible for my lungs to get well. And as I cannot conquer worry, I am doomed to fail. This outlook is black enough, but now if, in addition, I lose my senses, what will become of me?"

Having witnessed the suffering of many others who have felt this way, and having had a somewhat similar experience myself, I have found that to attempt to point out the weak places in the argument of the invalid, while sometimes successful, yet often fails of its purpose. At the time, the invalid is in such a frame of mind that he either cannot or will not see hope in any shape, form or manner. He persistently searches for proof to back up his side of the case, and is nearly always ready with a counter-statement which, if not altogether accurate, is yet sufficiently so to convince him that his view of the matter is correct.

Suggested Remedies. When one has thus gotten into a mental morass, so that each movement for extrication only causes one to sink deeper and deeper, if one

will keep as cool a head as possible under the circumstances, it will be found that several ways of escape are still open. Many others in the same predicament have succeeded in getting out by making use of some very simple expedient. Among the following plans it is very likely that you will find at least one suited to your case:—

1. Try to imagine yourself as standing in the place of a public defender. Against your real wish and will, you find it necessary to defend as best you can a client whom in your own mind you are convinced is guilty. Nevertheless, you are called upon to remember that, until actually proven guilty, the law assumes his innocence; that your view of the matter may be faulty; and that, at any rate, the commonwealth has employed you to do what you can, legitimately, for the prisoner at the bar. So you realize that even though your desires are otherwise, it is your bounden duty to make every effort to discover and tellingly present every whit of evidence in his favor.

Starting from this basis, from now on set your mind firmly to the task you have undertaken. Resolve that under no circumstances will you allow prejudice or previous conviction to stand in the way; that unflinchingly, unwaveringly, you will delve in every direction and seek to bring to light each and every fact that offers even the least possible chance of escape. Continually you must keep at the job of turning over the evidence, sifting it out and searching here and there for points that will provide a way out.

Tho the task seems hopeless, keep at it. Keep doggedly, persistently on, and first thing you know, little by little you will have accumulated enough evidence to convince you that your previous viewpoint was wrong, and that things are not half so bad as they seemed.

This method is very effectual. I have seen many who were at first in the darkest despair, but who unfalteringly kept on, ever searching for favorable points, who were at last overjoyed by having their efforts crowned with success; who came out from gloom to hope, from hope to confidence, and who finally emerged, fully convinced that they had won.

Even if your efforts in this direction are not wholly successful, they will at least ease your mind somewhat, and carry you along past the quicksands of deception and despair, till finally, with the lapse of time, Nature brings a turn in your condition, and you are forced to see that you are winning.

2. Choose some time in the twenty-four hours when you are feeling at your best, physically. This period is to be given over entirely to the purpose of reobtaining your mental poise and equilibrium—or, in other words, in getting a new and firm grip upon your mental faculties. Perhaps the evening, just after the lights are out, will be the most suitable time for this undertaking.

At this hour, when things are quiet, with nothing to disturb you, it will be easier to concentrate your thoughts on the matter in hand. Then, too, worry is perhaps most liable to impose itself on one during the night, so by setting the brain right before seeking sleep, you will be more likely to fall into a soft, restful slumber, and this will go a long way toward giving you peace and repose at all times.

First of all, you are to relax your muscles and find as restful a position as possible, so that bodily discomfort will not distract your attention. Comfortably settled, you are to commune with yourself somewhat as follows:

"There is really no reason why I should worry, for all worry is useless. Even tho I am very ill, even tho a thousand things have gone wrong, the fact is not altered

that worry accomplishes nothing. Hence, **I am going to stop worrying.**

"Others have been just as sick, or perhaps even worse than I, and have had just as many troubles; yet have not worried. Or, if they contracted the habit of worrying, they succeeded in breaking it. **What others have done, I can do.**

"Worry is retarding my progress; it is worse than a waste of time. Knowing that it is unnecessary, to allow worry to hold me back is pure folly.

"Our thoughts *can* be controlled if we try hard enough. *I* can control *my* thoughts. I *will* control them. Instead of being a slave to my thoughts, I will make them serve me. True, this will not be easy to do, but I have worked out other hard jobs. Before this, I have prided myself on being successful in carrying out whatever I have undertaken. Now, am I to weaken and allow little things like my own thoughts to control me?

"No. *I* will continue to be the master. I will prove that I can master myself. Thus I will not only help myself to reobtain health and happiness, but in time I will become able to reassume my part in looking after the welfare of those dear to me. Just now, however, I am in no condition to do anything for my friends or family. Therefore, much as I would like to do this I will not fret because I cannot. While I am down and helpless, this is not expected of me. To overtax myself through attempting to help them now, will only do harm. This would only hold me back and perhaps make it impossible for me to help them in the future. It would actually put a greater burden on the very ones whose burdens I wish were lightened. I must wait. I will not worry because I am able to do nothing in setting things right around me. At present this is not my business, and I will not be a meddler in what I should

not allow to concern me. Others must do the carrying on at this time. It is but right for them to do what they can for me. I must make their labors as light as possible by gracefully submitting to the inevitable, and resigning myself to resting and relaxing, and accepting their assistance.

"My present duty is to get thoroughly and completely well. Consequently, I will not allow injurious thoughts of any nature to recur, and hinder this achievement. I will concentrate all my efforts on the one thing. **Meanwhile I will not worry.** Later, when I am restored to my family, whole and well, I will be able to make up for lost time in making them happy. Then, I will also get full enjoyment out of life itself. But in the meantime, I will be patient and wait. In order that I may thoroughly recover at the earliest possible moment, for the sake of my dear ones as well as myself, I will stop worrying.

"Right now I am going to make a beginning, by putting all annoying thoughts from my mind. I will not allow them to return and intrude themselves and interrupt my rest and progress. I *will* sleep more soundly tonight."

The exact words are unimportant, but it is well to make use of the ideas they express, unless they are obviously unsuitable in your case. Whether or not you believe that the plan will prove successful, speak the words as tho you mean them. Make each sentence stand out. Confidence will come to you as you persist. If convenient for you to do so, speak the affirmations aloud.

Say the words slowly, clearly, thoughtfully. If it does not tire you too much, repeat each affirmation at least once. Each night, end the little session with your thoughts with this formula:

"Hereafter, when an unwelcome thought intrudes

itself, I will *at once* put it from me. I will force myself to think of something pleasant or helpful. If the undesired thought insistently recurs, each time I will resist it. No matter if I fail at first, I will consistently maintain this attitude. No matter how many times I fail to sidetrack the disagreeable thought, I will persist. **In the end I will win.** I will not allow painful memories or harmful thoughts—thoughts that I know to be unnecessary—to sap my energies and defeat my plans. By persevering, I am going to regain complete control of myself, so that my brain will stop working, instantly, when I call a halt.

"Worry is needless: it is harmful. It can be stopt. Others have conquered worry, and there is no reason why I cannot do likewise. I *will* succeed. Now I am going to compose myself, put aside all troublesome thoughts, and in a little while, I shall fall into a restful, refreshing sleep."

Make this session with your thoughts a nightly habit, a part of your creed. Let your thoughts attend the session regularly each evening at a set hour. In time, it is very probable that you will see that you are winning. Instead of permitting your nerves to rule you, *you* will assume command and become the master of your own destiny.

3. Whatever the cause, your brain has formed the habit of working overtime. Furthermore, we shall assume that the habit has already become pretty firmly fixt, so it may not be practicable to break it off sharply and at once. Instead, why not employ a little diplomacy in dealing with the errant organ? Why not contract a good habit of thought to counteract the bad habit?

Just think of the brain as a misbehaved child, that has been romping boisterously about and getting into all

sorts of mischief and difficulties. Of course, you might send the youngster promptly off to bed, and command it to keep quiet and go to sleep. But, here your previous experiences press forward and remind you that this plan has often failed. So you conclude to try another scheme. You decide that instead of at once seeking to calm and quiet your brain-child by a sharp word of command, you will endeavor to guide its activities into some different, safer channel.

Thus, you may adopt some hobby. Almost any kind of a hobby will do, provided that it is not in itself harmful. Even tho you are confined to bed, some scheme may be devised for occupying your attention and brightening the dark moments. For example, why not interest yourself in the bird life about you? For a small sum you can obtain from your bookseller a very neat and handy little volume, in which is presented by word and brush, accurate and vivid yet short and concise descriptions of the markings, traits, songs and general distinguishing characteristics of all the birds in your neighborhood, as well as a multitude of others. Taken up in even so small a way, it is not unlikely that you will become more and more interested and entranced with the subject, and, what is more to the point, you will soon find that you are being helped definitely on your way.

Or, perhaps some other of the myriad of Nature's wonders will offer more attraction to you. Nature is everywhere, so no matter where you are, if you will but try to forget yourself, and look about you, close at hand, or even right from your window may be found many things to draw and hold your attention.

Or, if you find it hard to interest yourself in the ordinary manifestations of Nature, perhaps if the nature study takes a more practical trend, you will become interested. Suppose then, if your condition permits, that

you take up some correspondence course, on, say, date growing, olive culture, bee-raising, or some kindred subject that will really help to fit you for future work. Most excellent courses of this sort, with membership at small cost, have been arranged by many of our large universities; and accurate information along still different lines may be had from other sources for a moderate outlay.

Or perhaps some phase of literature or art, of electricity or mechanics, or again, stenography or some light business course, will prove more attractive and suitable.

At all events, the aim should be to select some line of thought or endeavor that is agreeable.

Caution: This plan is, of course, not to be considered at all unless one is at least fairly well along in the convalescent stage. Even then it should be remembered that study of all kinds is really against the rules, and that in allowing oneself a little leeway in this direction, one is doing so merely because this appears to be the lesser of two evils.

At the start, make up your mind that you will not take up the little project too energetically. Bear in mind that you are primarily seeking only a pastime, and do not allow yourself to make a task, or even work, out of the undertaking—else more harm than good will be done. Under no circumstances set yourself to accomplish so much in a given time; nor allow the reading to tire you. Probably it will be best to fix a definite hour each day, at which time—with interest but without hurry, with pleasure but without intense concentration—slowly and rather lazily you dream along from page to page.

Work for the Fingers May Keep the Mind from Mischief. On the contrary, you may find that if the hands are kept busy, this is the best way to quiet the brain. Here then, crocheting, knitting, basketry, art metal

work, picture frame making; or, if you are strong enough, some light employment calling for a minimum amount of manual labor, such as chair-seating, may prove a boon to the excited nerves. "Handicrafts for the Handicapped," a little volume by Hall and Buck, may aid you in selecting and carrying on the little avocation.

Again it may be that some form of amusement or game will best serve to divert your thoughts from yourself and troubles. While you are still in bed, or while sitting up, you may make a beginning along this line. Later, as you begin to get up and about, it will become still easier to select some game as a harmless hobby or pastime. This will help to remove that feeling of complete idleness and help to pleasantly while away the hours.

Always, however, whatever the undertaking, you should be guided by the rules for rest and exercise set forth in Lesson IX.

4. After all, perhaps you require a change of scene or environment, or both. Frequent changes of residence are rarely called for, and are often decidedly harmful; yet sometimes a change is very much needed. If you are not in harmony with those around you; or if for any reason you have become so out of tune with the old surroundings that you are living in a continual whirlpool of dissatisfaction and discontent, the likelihood is large that a change will prove of benefit.

Before definitely deciding the point, however, it is advisable for you to read Lesson XII, giving special attention to the question of the advisability of making a change of locality, noting carefully the rules for making the journey, and taking to heart the warning against the wanderlust.

Then, too, do not forget that it may be unnecessary to make a *long* journey. For the present purpose, it is

chiefly a change of scene and surroundings you require; this you may find within a very short distance. It is not unlikely that merely changing your residence to a different part of the town or the city, or merely moving to the country, will lend newness and attractiveness to the surroundings and tremendously increase your chances.

5. If other means fail, and you still continue to chafe and fret, and to live in fear and dread, it may be permissible for you to increase your liberties slightly—to relax a little in your observance of the rest schedule. In this way, you will hope that at the expense of a little physical rest you will gain more than enough mental rest to pay for the sacrifice. Therefore you will increase your allowance of exercise only as much as necessary to achieve this purpose, and in no case will you deviate markedly from the *rest* schedule you have previously worked out for yourself according to the directions given in Lesson IX.

In extending your allowance, there is one thing in particular to guard against. Often, the more liberties one allows oneself, the more one wants. So, before increasing your allowance at all, gird on your mental armor and steel yourself against yielding to any temptation of this nature that may later arise.

How Others Have Come Back

When you are so deep in the dumps that you are convinced you are down and out for good, just stop a few moments and remind yourself of those who at one time were in as serious a condition, or perhaps even worse than you, but who kept on trying till they finally won back.

For example, here is the case of a young man whose health failed while he was yet in college:

On discovering that he was losing his health, immediately he set about redeeming this precious asset, but, as is so often true, his early efforts were for the greater part in the wrong direction. His condition varied up and down—each time going down a little farther than it came up—the net result being that two years later he awakened to the realization that his health was in a most precarious state. Having harbored the mistaken idea that he must not allow himself to become bedfast, lest, as he thought, he would never get up again, he had persistently forced himself to stay on his feet day after day and month after month. Now, however, he had become so weak that it was impossible for him to remain up and about any longer, so he was compelled to go to bed.

Fortunately, about this time the young man learned that rest was one of the most important items necessary for recovery. This knowledge altered the whole aspect of the matter, so he now became a philosopher, and resigned himself to wait patiently while Nature did her work. For many, many months the fever continued to rage, and his already frail body wasted away to a mere shadow. Finally, he grew so weak that he could not turn his head on the pillow, nor even change the position of his feet or hands, unassisted. Yet he never entirely gave up hope.

After he had been in bed for eight months, on top of all the other difficulties there came a series of large hemorrhages, which served to sap almost the last ounce of his flickering vitality. He became unconscious, and at one time even his physician felt that his patient could not live ten minutes. Nevertheless, a faint spark of life remained. For weeks the young man lingered on the edge, while the weight of a feather would have turned the scales. Then slowly he began to rally. One morning

he opened his eyes, looked round and said, "Doctor, I'm better to-day; I feel that I am going to get well."

The turning point had come. From then on, it was a long slow battle. The gain was steady and progressive, but very, very slow.

For two years after the first improvement was noticed, it was necessary for him to remain abed. All this time he was regaining strength and weight, but the loss had been so great that many months were required to replace it.

During the third year of convalescence, he contented himself to remain in bed nine-tenths of the time, altho (when idle) he felt well, and to casual inspection, appeared well. Very gradually, thereafter, he began to get out a little more, and to season himself by taking regular, progressively increased walks.

So his progress continued, until to-day, seven years after his original breakdown, he is a specimen of robust manhood, happy in the enjoyment of abounding health and in the ability to earn his livelihood.

Another Remarkable Recovery. Now we come to the case of a young lady stenographer, wholly dependent on her own labors for her income. Under the continual strain of long hours of hard work, at the age of twenty-four she found that her health was beginning to break. Altho she thought she was merely "run down," she well knew that she needed a prolonged rest, but saw no chance of obtaining it. So she comprest her lips and held up her head and continued at work, even tho she felt like dropping. For six long months—months that seemed years—she kept faithfully and regularly at work.

Suddenly one day she collapsed in the office, and came to realize that she must cease her labors, no matter what happened. She resigned her position and, after due reflection, made up her mind to stretch her small

fund of savings to the utmost. She stopt work at the office, but failed to put a check on the activities of her brain, which continued to work overtime, ever seeking the way to make the dollar go farther. She lay down during part of each day, but skimped on the actual necessities; hoping meanwhile that the day when she could resume her duties would soon come.

It was not long till her meager resources were completely exhausted. She had recuperated somewhat, but the gain was not great. For, tho her body had rested to a certain extent, her brain had worked all the harder. This, with the lack of proper food, had hindered her progress materially.

Still, tho she knew she was far from fit for work, she must live somehow.

Her former employer was glad to have her back, so she returned to the office and took up the old routine grind. Tho she soon found herself slipping week by week, she stuck to the job, until one day she was seized with a burning fever; at the same time her cough suddenly became much worse. In a few days her physician informed her that she was suffering from "galloping consumption."

Not long afterward, the young lady wisely put away all false pride, and allowed herself to be taken to a free tuberculosis sanatorium.

Here, despite the change, she continued to sink, and it was not long till she grew so despondent as to give up all hope of surviving. She yearned to die and have it over with. For a time it seemed as if this wish was certain to be fulfilled. Her condition grew worse and worse: now the fever was up four to seven degrees every day; the cough was very frequent and often agonizingly severe, the expectoration very profuse; her breath came in short gasps, each one of which seemed as if it would

be her last. Widely through both lungs the disease spread like wildfire, while the thread of life grew thinner and thinner.

At last, however, just when the ravages of the plague had become so extreme that it seemed there was nothing left of the frail, feeble body, the fire died down and burned itself out.

After this, month after month, slowly but surely strength and cheer were regained, till at the end of two years she seemed even stronger and better than before her illness. She was exceedingly happy and felt fine, but was not yet well.

Nevertheless, having learned how to take care of herself, the young lady felt safe in again taking up her usual work. This she did, cautiously; meanwhile making the most of all time off, for adding to her store of strength and energy. She continued to gain, and, as she gained in health, she climbed higher and higher on the ladder of success, until, at this writing, ten years after first being forced to stop work, any business day she may be found seated at her desk, smilingly greeting the patrons of the firm, in which she is now a partner.

Instance after instance of this nature could be cited, but the two cases just related will suffice to show that in the darkest moments of all there is always room for hope. Courageously keep on, and you, too, may be overjoyed to find yourself emerging from the dark depths of despair into the ever brightening sunlight of hope, and from mere hope into the actual attainment of your rightful heritage of health and happiness.

LESSON XV

SPECIAL METHODS OF TREATMENT AND SURGICAL MEASURES

PATIENTS are usually anxious to inform themselves concerning the various remedies and remedial measures useful in tuberculosis, so an effort will now be made to make note of the chief remedies and special modes of treatment in use to-day, with occasional remarks on their basis of action and other points of interest. Because the tuberculin treatment is perhaps the most widely heralded of the special methods, it will be the first considered; but preliminary to estimating the pros and cons of tuberculin, a few moments may advantageously be given to discussing a topic that will make clearer the how and why of its action. This topic is—

ACTIVE CONTRASTED WITH PASSIVE IMMUNITY

When for any reason an individual becomes extraordinarily resistant to a disease, he is said to have acquired a greater or less immunity to the particular ailment under consideration. Various methods have been employed to strengthen the normal resistance of the body to disease. For the present purpose these methods may be classified as pertaining to (1) *active* immunity, and (2) *passive* immunity.

1. **Active Immunity.** If one is attacked by an acute disease, such as measles, after recovery one is unlikely to again "catch" the same disease. This freedom from liability—which is of course not absolute—is termed *active immunity*. Similarly, vaccination for the

prevention of smallpox induces an active immunity against this disease. Likewise, a greater or less resistance (immunity) to various diseases may be induced in animals by inoculating them with at first small, then larger, progressively increasing doses, of the germs or poisons responsible for the disease in question. Immunity induced in any one of these ways is spoken of as *active* because it is built up in the individual person or animal, as the case may be, that harbors the disease-producing germs or poisons.

2. Passive Immunity. Now suppose that an animal has been inoculated with proper-sized, gradually increasing doses of a particular variety of germ, or toxin (the poison produced by or derived from a disease germ) until it has developed a high resistance to this special variety of germ or poison. Suppose further, that at this stage of the experiment blood is drawn from the animal, and the liquid portion of the blood—the serum—is injected into a human being ill of the identical malady —assuming further that the carrying out of these steps results in curing the sick person through the transfer to him of protective or immune substances previously formed in the animal's body. The protective power received passively in this manner is called *passive immunity*, and it is precisely in this way that diphtheria antitoxin (anti-diphtheritic serum) which has revolutionized the treatment of this one-time dread disease and has saved thousands of lives, is produced.

Offhand one would say that of the two methods, the safer and surer must be passive immunization. Certainly this would *seem* to be true in the event that the use of one or the other of the two procedures is under consideration for employment with hope of benefiting a person who is already ill. That is—when the method is to be used for its curative effect, and not as a preventive.

Yet, strange to add, passive immunization has so far proven notably successful in only a very limited number of diseases. (One reason is that in some diseases the antidotal or immune substances remain chiefly in the fixt tissues of the body, and therefore cannot be transferred to the human being in effective amount by means of the blood.) Moreover, oddly enough, investigations have established the fact that in certain diseases it *is* possible to raise the resistance of the individual to a disease with which he is at the time afflicted; that is to say, to a limited or moderate extent it has proven practicable to induce active immunity in the body of the person who is at the time ill. This means, as explained in Lessons IV and VIII, that Nature sometimes has power to work harder and more efficiently in overthrowing the ills under which we labor, if only she is properly stimulated to do so. She has the energy, but it is dormant, and an effective outside stimulus is required to transform the idle potential force into actual kinetic, antidotal or germicidal power. Once Nature's energies are fully aroused, and kept continuously aroused, she herself goes ahead and completes the healing and cure.

Tuberculin

Tuberculin, originated in 1890 by Robert Koch, the discoverer of the tubercle bacillus, is an extract prepared from dead tubercle germs.* The basis for the use of tuberculin is as follows:—

In carefully chosen cases of tuberculosis, when Nature fails to bring fully into play her power for healing, by arousing her dormant energies the injection of appropriate doses of tuberculin serves a useful purpose. If

*There are now a wide variety of tuberculins. They are all similar yet slightly different, and some of the newer varieties can be safely used in cases for which the old or original tuberculin was altogether unsuited.

the doses and the intervals between doses are correctly estimated, following each dose there is brought about a congestion or mild inflammation in and around the focus of tuberculosis. Now, if it is understood that early in the evolution of the tubercles the blood supply to the diseased area is greatly reduced, and that the later development of scars (which by limiting the escape of poisons into the general circulation and by walling off the tubercles helps to localize the disease) further interferes with the circulation of blood in the tubercles, it is readily seen, how, following each dose of tuberculin, the influx of fresh blood, bringing a new army of corpuscles to combat the germs, with reparative and healing material, will prove of benefit.

That the good results of the tuberculin treatment are derived chiefly in the manner just described (that is to say, through a local stimulation in the focus of tuberculosis) there is no doubt, but some observers hold that tuberculin is also materially helpful in quite a different way. According to this view, the cells and tissues of the body distant from the disease focus are capable of material assistance in the fight against the germs if only a suitable stimulus is brought to bear upon them. So if tuberculin is injected into these healthier parts of the anatomy, the tissues are stimulated to manufacture antidotal or anti-substances to neutralize or destroy the injected tuberculin. Here an interesting law of Nature comes into play: Once thoroughly awakened, Nature is inclined to overdo things. In the present instance this takes the form of an over-production of the anti—or immune—substances (more than enough to counteract or destroy the dose of tuberculin just administered), and the surplus of anti-substances—sometimes termed antibodies—then circulates in the blood stream, ultimately reaching the lungs, where the anti-substances come in

contact with, and neutralize or destroy the virulent poisons and live germs of tuberculosis.

In administering tuberculin, the treatment is inaugurated with small dosage, and when the maximum benefit has been obtained from each dose, by repeating or increasing the dose at judicious intervals, the aim is to keep Nature constantly on the job, with her energies working against the disease at the highest pitch consistent with safety.

Value of Tuberculin. Unfortunately, tuberculin has not accomplished nearly as much as its originator hoped for, yet in competent hands, administered in carefully selected cases, it adds to the chances of recovery and is worthy of use. On the other hand, given indiscriminately to all patients, or by those unfamiliar with its use, tuberculin can do harm. In brief, if one is in the hands of an expert who deems the case suitable for tuberculin, one may permit the injections without fear, with perfect confidence, and with reasonable hope of benefit, **provided this does not make necessary the slighting of one of the more essential items.**

This means that altho tuberculin is valuable, it is worth less than rest, wholesome food, fresh air, a congenial environment, competent medical supervision, sufficient time, and a favorable climate. On the other hand, if one can have all of these things, with tuberculin in addition if the case is suitable, so much the better. Again, if it is impossible under any and all circumstances to obtain sufficient rest or the like, and if the case is appropriate,* tuberculin will improve the outlook for victory.

*Many have the fixed belief that tuberculin should never be used in the presence of fever. The real guide is the responsive power of the body, which can be estimated only by a careful study of all factors in the case. Many patients having low, moderate or high fever, or who are, on the contrary, entirely free of fever, are not suitable subjects for treatment with the older varieties of tuberculin. Other patients without fever, or with but mild fever, can be treated successfully, and some of the newer preparations of tuberculin nature can be safely used in cases with considerable fever.

Vaccines

In principle similar to tuberculin, vaccines have been prepared against the "mixed" or secondary infections so common in tuberculosis, for the prevention and alleviation of "colds," etc. If the vaccine is prepared from germs cultivated from the patient's own sputum or other discharge, it is called an "autogenous" vaccine. On the other hand, if it is made from germs obtained from other sources, it is spoken of as a "stock" vaccine. Each variety has its drawbacks: each has its good points. Given with discernment, vaccines are useful additions to other treatments in certain cases.

Remedies for Passive Immunization

Among remedies designed to confer passive resistance to tuberculosis, a preparation known as "I-K" (meaning immune bodies) has enjoyed more or less favor for a number of years. In the production of I-K, the aim is first to actively immunize an animal both against tuberculosis and the germs commonly responsible for mixed infection (a definition of active immunity may be found on a previous page); the animal is then bled and an extract prepared from its blood corpuscles—this extract constituting I-K. It is the belief of the originator of I-K, Dr. Carl Spengler of Davos, Switzerland, that the corpuscles of the blood are of more importance as sources of protective substances than is the liquid portion of the blood, the serum.

Speaking broadly, I-K may be said to be safer than tuberculin. It can also be used in certain cases for which tuberculin is unsuitable. On the other hand, it is the consensus of opinion among physicians who have had a large experience with both remedies, that for patients to whom either remedy may safely be given, tuberculin has the most value to offer.

Other preparations, the object of which is to transfer immunity from the animal to man have been developed, tho they have not been used extensively in this country. In general, so far as benefit is concerned, they are comparable to I-K.

The X-ray and Radium

Since the announcement to the world in the last decade of the nineteenth century of the discovery of the Roentgen or X-ray, it has been hoped that a way would be found to turn this wonderful agency to account in eradicating tuberculosis.

Up to the present this hope has been fulfilled only in part. In tuberculosis of the lymph glands (scrofula) and of the bones and joints (the "white swelling" of former years—in two of its relatively frequent locations termed Potts' disease and hip-joint disease), as well as in other localized forms of tuberculosis, the X-ray has in many instances proven of decided benefit; as it is learned how to apply its healing rays to advantage it is probable that it will become more and more useful in such cases.

As tuberculosis of the lungs makes up the great bulk of tuberculosis cases, it was for its effect upon this form of the disease that the hopes of thousands soon focused upon the newly discovered ray. This hope has not yet been satisfied, for altho here and there a physician has reported success with the X-ray in pulmonary tuberculosis, and many investigations are being faithfully prosecuted, with some apparent advance, for the present the Scotch verdict, "not proven," must still apply.

Radium. With the discovery of radium, many eyes turned to it as the long-hoped-for charm against the white plague. Yet up to this writing this wonder-element has failed in tuberculosis to duplicate its accomplish-

ments in certain other diseases. Radium is now applied locally, taken internally and given by the needle directly into the blood stream, and has been more or less helpful in a wide variety of ailments. In tuberculosis it is sometimes of service in relieving pleurisy and other painful conditions, and has a general tonic effect of value. It has also wrought benefit in tuberculosis of the lymph glands and skin—but beyond this it has so far wrought little of benefit.

Artificial Light Treatment

In Lesson XI emphasis has been placed on the value of sunlight, if properly employed. Among the drawbacks of this form of treatment have been the inconstancy of the sun in many localities, the intolerable heat in others (whereas the cold rays are really the most valuable), and the like. Lamps for producing light artificially to overcome the objectionable features of sunlight and with other features of advantage, have been devised. Among these light-producing agencies, the so-called Alpine Sun Lamp is perhaps most widely used. In this lamp, the passing of an electric current through mercury vapor in a vacuum generates an intensely bright light which is emitted through a burner of transparent fused quartz. The light produced in this manner is very similar to sunlight, without, however, its intense heat, and is extraordinarily rich in the health-giving violet and ultra-violet rays. By this means, an intensified light can be produced at will, and the light treatment carried out regularly and consistently in any locality without regard to weather fluctuations; the dosage can be more accurately controlled, and less time need be allotted to each seance than when the sun's rays are used. Light (both natural and artificial) is a useful adjunct in the treatment of certain cases of lung tuberculosis, but has an





APPLYING SUNLIGHT TO THE THROAT

Light is a valuable agency in the treatment of the larynx or voice-box, and reflected, condensed sunlight is especially useful for this purpose. On the left is shown a patient directing sunlight into his throat by means of the solar laryngoscope. Light strikes composition reflector "A" (see diagram on right) where it is condensed and projected onto composition reflector "G," thence into larynx, while the eye sees the light playing on the diseased part in the mirror "B."

Diagram courtesy of General Service Co., Colorado Springs.

even larger field of usefulness in the treatment of tuberculosis of the peritoneum, of the bones, joints and glands, and other so-called local forms of the disease.

Treatment with Animal Products

Since it was learned years ago that children who were victims of cretinism—a form of physical and mental stunting, sometimes amounting to actual idiocy, associated with the absence or maldevelopment of the thyroid gland in the neck—can often be rescued from a life of helpless dependency and transformed into real human beings, merely by feeding them the thyroid glands from sheep or other animals, the principle of treating the sick with products derived from animals has been used successfully in other diseases. Preparations of this nature have also been employed in tuberculosis for various reasons. As regards the results obtained, the limits of space permit merely the bare statement that certain animal products are now available which, given for definite objects according to individual circumstances, add their quota toward success. As this field is explored more and more widely, it is probable that remedies of increasing value will be developed.

The Russell Dietary Treatment

A mode of treatment that can be made use of in the home and which is worthy of trial in certain cases is the so-called Russell dietary treatment. In Lesson IV was explained how in the healing of tuberculosis Nature deposits lime salts in the form of a cement-like material in and around the tubercles. In order to make available an abundant supply of lime for this and other purposes, the Russell method aims to furnish a large amount of lime-carrying food and to assist in the digestion of the food and in the assimilation of the lime.

It has long been known that milk and eggs contain an extraordinarily large per cent of lime, and this is one of the reasons why these two staple food articles have for years held a high place in dietaries for the sick. One phase of the Russell plan of treatment consists in the eating of certain definite amounts of milk and eggs, to which dilute hydrochloric acid (which is a normal constituent of the stomach's digestive fluid) has been added for the purpose of assisting the process of digestion and to facilitate the assimilation of the lime contained in these foods. To make doubly sure that an adequate quantity of lime is available, this is supplemented by the eating of a special lime food prepared from fresh, uncooked chicken bones. The third part of the treatment consists in the taking of an emulsion of easily digested mixed fats. The function of this emulsion is merely to provide in an attractive, convenient form a certain amount of concentrated fat food. The pulmonary invalid is often inclined to partake but sparingly of fatty articles of food, whereas on the average he actually requires a somewhat larger per cent of fat than a well person. This fat is necessary in part to furnish reserve energy, but also because fat seems to favor the deposition of lime in and around the tubercles.

Rules for Taking the Russell Treatment. (1) Thoroughly beat two raw eggs, then mix with a quart of fresh milk and beat again. Add 240 drops of chemically pure *dilute* hydrochloric (muriatic) acid, and once more beat or stir well. The acid will thicken or clot the milk to a greater or less extent—this being the first stage of its digestion. Immediately on the addition of the acid the mixture is ready for drinking, but that portion which is not drunk at once should be kept well cooled until consumed. One glass of the mixture is to be taken immediately after each meal and a second glassful is taken

one-half hour after the mid-day meal. Each time just before drinking the mixture should be stirred.

(2) One-fourth of a level teaspoonful of the Russell prepared lime food (a palatable jelly-like preparation obtainable of the druggist) is taken twice daily, with or immediately after breakfast and the evening meal. Probably the easiest way to take the lime food is to place it upon the tongue and swallow with a little water, altho some prefer to take it spread upon bread.

(3) If one has lost much weight and fails to gain on a dietary of ordinary amount, the emulsion of mixed fats may be added to the above regimen. In this event one tablespoonful of the Russell emulsion of mixed fats is taken in a full glass of *hot* water one and one-half hours after breakfast and the evening meal. If after a reasonable length of time a gain in weight fails to materialize, and provided further that the emulsion is well tolerated, it will probably prove helpful to cautiously increase the dose every few days by a teaspoonful or a tablespoonful, in some case until four tablespoonfuls are taken twice daily.

Notes and Suggestions. When preparing the milk-egg mixture the first time the approximate bulk of the 240 drops of acid may be estimated, so that thereafter it will be unnecessary to pour out the acid drop by drop, as the variation of a few drops one way or the other is unimportant. The ordinary teaspoon holds about eighty drops.

It is sometimes advantageous to take an extra pint or quart of milk (either with or without the addition of one or two eggs to the pint or quart of milk, respectively) with which acid has been mixed in the proportion just indicated. This extra nourishment may be taken at the time that appears most suitable in the given case.

Some persons are habitually or periodically troubled

with an oversupply of the hydrochloric acid in the stomach juice, and in this event to add hydrochloric acid to the food will only add insult to injury. To guard against this mishap, when the patient has been troubled with burning in the stomach, or if any other symptom seems to point to excessive acidity, the milk-egg-acid mixture should be taken with great caution, and a smaller quantity of acid should be used during the first few days. If the stomach symptoms become aggravated, after a fair trial this part of the treatment had best be abandoned. On the other hand if all goes well the amount of acid may be increased to the regular amount.

Finally, it should be borne in mind that in large part the Russell method is, after all, a special method for forced feeding. Altho forced feeding is sometimes worth while, it should not be forgotten that it has serious drawbacks and dangers (see Lesson IX). Remember, too, that whatever the method of forced feeding employed it is highly essential that efficient bowel evacuations be maintained. So when making use of Russell's method strict attention to this point will obviate much difficulty. During the course of treatment it is often necessary to take a mild laxative nightly. For this purpose, cascara, compound licorice powder or one or two A.B.S. and C. tablets are quite reliable. In addition it is in many cases a good plan to take every week or ten days a good-sized dose of castor oil or its equivalent.

Other Remedies and Outlook for Future Advance

Throughout the world thousands of zealous workers are conducting investigations from a multitude of angles in the continual search for a remedy of sovereign value. Tho no specific remedy of high potency has been brought forward, a number of non-specific but nevertheless valuable remedies, have been produced, and the prospects

are bright for the development of better remedies. These non-specific remedies are derived from a wide variety of sources, but the limit of space prevents describing them here. Suffice it to say that they come from the vegetable, mineral and animal kingdoms, and that in using them the physician's main purpose is to assist in strengthening the bodily defenses against the germs. In one case, or for a certain period, one preparation may be administered to increase the number of red corpuscles in the blood or to improve their quality, another may be used for its effect on the white corpuscles, another to supply healing material in larger quantity, through the use of others the physician endeavors to increase the germicidal power of the blood, others are given for still different purposes, but the chief aim in nearly all instances is to supplement or reinforce Nature's efforts in one direction or another.

A promising line of exploration is the realm of chemical treatment. The object of the chemical treatment is to develop a remedy having a special affinity for the germs of tuberculosis or for tuberculosis tissue, or both, so that it will either kill the germs directly or else stimulate healing in the area of disease without injury to the sound tissues of the body. As an example of the way in which the investigations are prosecuted, the following instance may be cited:—

Several groups of scientists are using various kinds of dyes in their experiments. The dyes are first administered to tuberculous animals; then, by examining the bodies of the animals after death, the microscope will readily detect whether or not the particular dye under consideration has a strong affinity for the tuberculous tissue or germs. A number of dyes have been found or originated having a selective action of this nature. So, too, there are numerous germicides which will destroy

the tubercle bacilli outside the body. Thus far, however, no dye has been discovered or produced in which the selective affinity (so necessary to avoid harming the individual) and the germicidal or healing effect are both marked, tho some encouraging results in this direction have been achieved.

Research has opened up many other interesting avenues of hope, and any day may see the efforts of one or more of the many earnest research workers, who are consecrating their lives to this cause, crowned with the glory of achievement. It is probable, however, that the methods now used successfully, which are in the main natural methods, will always or at least for many years remain unsuperseded as the sound foundation on which adjunct methods may be added. The remedial agency or agencies of the future will probably be supplementary to those of the present. They will not be sure-cures nor magic keys to health, but will help save many more lives and will shorten the time given to recovery.

In concluding this little talk on remedies for tuberculosis, let it be made clear that while there can hardly be said to be in existence a single medicament or measure for use in all cases, yet the use of the appropriate remedy at the opportune time may materially influence the progress of the case, and even turn total failure into success. The physician who uses all means to safeguard the interests of his patient is continually on the watch for small changes in his condition, so that he may meet them promptly by modifying or making suitable changes in the treatment.

Surgical Procedures

Instances in which the knife is worthy of use in tuberculosis of the lungs are far between. When a definite abscess of the lungs is present it is sometimes

advisable to open and drain it (altho certain cases of lung abscess have been cured by the method of treatment known as artificial pneumothorax—to be described in a moment). Under very exceptional circumstances a drainage operation may be resorted to for the purpose of facilitating healing of a more ordinary cavity, if superficially situated. Again, in rare instances, the question of the removal of one or more ribs, for the purpose of allowing the chest wall to fall inward, so that the lung will collapse and be given rest (or other operations to aid lung collapse) may be considered. Similarly, an attempt to cut away part of the diseased lung may be taken under advisement. So, too, in the event of certain complications, for example, the accumulation of pus in the pleural space between the lung and chest wall—empyema—some procedure for securing thorough drainage may be warranted. When, however, the accumulated material resembles, yet is not true pus, more conservative methods are usually in order. On the whole there is only a small field for strictly surgical procedures within the chest. Within the last decade methods for operating in air-tight cabinets under air-pressure conditions that lessen the danger from sudden collapse of the lung during operations have been devised, but even with this safeguard, surgery of the lungs has not achieved a great deal.

The Pneumothorax, "Gas" or Compression Treatment

There is, however, one method of treatment, mechanical in its nature, sometimes classified as a surgical procedure, which constitutes a notable addition to the weapons useful against tuberculosis. This, the pneumothorax or compression treatment, sometimes spoken of as the "gas" treatment, has now been employed suffi-

ciently widely during a number of years to conclusively establish its value.

The word, pneumothorax, signifies the presence of air or gas in the thorax or chest, it being further understood that the gas is present in the pleural space—that is, between the lung and the chest wall. It has long been known that spontaneous pneumothorax occurs in certain cases of tuberculosis (usually as the result of the rupture of the wall of a superficially situated cavity, allowing the air to escape from the lung into the pleural space). The sudden escaping of air in this accidental manner is often quite a shock to the patient, and has other dangers, but nevertheless it was noted in certain instances that definite improvement in the condition of the patient dated from this complication. The sequence of these observations was that a way was sought to bring about pneumothorax artificially in such a manner as would secure its benefits and at the same time avoid the dangers associated with its onset under ordinary or natural circumstances.

The purpose of the treatment is to lessen the expansion and contraction of the lung, and, degree by degree, a little at a time, to compress it more and more with a cushion of gas until, in some instances, it is completely collapsed. Thus, the organ is given rest, poisonous secretions are squeezed out so that absorption of toxic material is diminished, and the walls of cavities pressed together —all of which favors healing.

The gas (or more recently, air) is allowed to enter the chest very slowly through a hollow needle inserted into the pleural space. Only a very small quantity is introduced at the first injection, which is repeated in a day or two. During subsequent treatments a slightly larger quantity of air may be injected, tho speaking broadly, the best results are obtained by the injection

of relatively small quantities at comparatively short intervals.

At first a considerable part of the gas disappears (is absorbed) between injections, but as the lung is comprest more and more the gas is absorbed correspondingly more slowly, so that as time proceeds the injections can be spaced farther and farther apart. Altho good results have sometimes been achieved in shorter periods, it is ordinarily provident to maintain the lung collapse for from one to two years—or for a longer time.

Cases Suitable. The ideal case for pneumothorax is one in which one lung only is affected, with but a few if any pleural adhesions present (which latter may so bind the lung to the chest wall as to make difficult or impossible the introduction of sufficient gas to be of service), and with the heart in good condition. It is obvious that this form of treatment makes it necessary for the opposite lung to perform extra duty and puts an undue burden upon the heart, so it is imperative that these organs be able to stand up under this unwonted strain. As a matter of fact, the ideal conditions just mentioned are seldom found except in very early tuberculosis, and inasmuch as excellent results are obtainable in early tuberculosis by the more ordinary methods, it is questionable whether or not this special treatment should be undertaken in this class of cases.*

Fortunately, however, with the technique as now developed, whereby the lung compression is brought about very, very gradually, it has proven practicable to use the method successfully even tho the opposite lung is

* In the present state of our knowledge, save when other means have failed, or under other extraordinary circumstances, I personally am opposed to the induction of pneumothorax in *early cases* unless the patient desires it with the distinct understanding that its utility in this stage of the disease, above and beyond other measures, is not thoroughly established. However, it is possible that time may prove that a larger percentage of good results will be obtained by employing pneumothorax early in the disease.

affected to some extent, provided the heart is fairly sound and the pleural adhesions or bands not very dense or extensive.*

In conclusion it may be said that altho the actual introduction of the gas is simple, and in skilled hands, from a practical standpoint, safe, yet the procedure is not to be looked up as altogether free from danger, nor to be haphazardly applied. On the other hand, with care in choosing the case the danger is small, and the results often remarkable and most gratifying. The most important result of the treatment is that it unquestionably saves lives that would otherwise be lost; most gratifying of all, it saves certain patients with far advanced tuberculosis, to whom, steadily failing despite all ordinary measures, we formerly had nothing to offer. Moreover, to a certain extent it cuts down the time that need be devoted to recovery; or at any rate the patient may often have more freedom while reclaiming his health than he would otherwise be allowed. On the whole, when the case is suitable, the pneumothorax treatment is a most valuable supplement to other time-tested measures.

Suggestions for Refractory Cases

For those cases that do not yield to ordinary measures, or to ordinary measures as usually applied, among the following suggestions may be found one or more to fit the necessities of the given case, and which may fill an important place in a winning program.

1. Absolute Rest. The patient should remain in

* When adhesions prevent effective collapse of the lung, surgery may still save the day for the patient. By painstaking technic, it sometimes proves practical to release the lung by dividing the adhesions. In other cases, the ribs overlying the seat of disease, may be removed in part or whole, allowing the chest wall to sink inward so that collapse is brought about. In still other instances, pieces of fatty tissue are transplanted, or foreign material inserted beneath the superficial structures and over the tuberculous area, to assist collapse. There is no question that many lives have been saved by these methods after all else has failed.

bed constantly, use a bed-pan, and not get up for any purpose. No reading should be permitted, but the sick person may be read to in moderation if no bad effect is noted. The utmost care should be used in nursing, the attendant should feed the patient, and liquids should be taken from a feeding cup or through a drinking tube. Every effort should be made to keep the patient comfortable, contented and cheerful.

2. **Silence.** The voice should not be used, however little, not even whispering, for any purpose whatever. See Lesson IX, p. 199.

3. **Postural Rest.** In order to give the worst lung the maximum amount of rest and quietude, the habit of lying on this side a greater portion of the time (turning on the opposite side or in some other position perhaps only if, and when necessary to help in clearing out the secretions) may be cultivated.

4. **The Chest Binder.** A belt or binder to fit snugly over the upper part of the chest (in which situation the tuberculosis is usually most severe) to give this part of the lungs relative rest, is worn constantly, or almost constantly, for weeks or months. The binder is conveniently made of herringbone belting, and should be extra long so that when it is put on, the ends will overlap some five inches. About five inches from one end elastic webbing is sewn, and to the other end buckles are affixed. Narrow shoulder straps to keep the binder from slipping downward should also be provided. Before putting on the binder, care should be taken in padding the arm-pit folds to prevent chafing. The belt is then loosely applied, after which the patient expires and holds his breath while the buckles are tightened sufficiently to restrict the movement of the chest.

When the active tuberculosis is situated in the lower part of the lungs, or if the case is complicated by tuber-

culosis of the bowels, it is not advisable to use the belt, but in other refractory cases this is a well worth while procedure.

5. Water Drinking for Relief of Fever. If fever persists, especially if it is high, and provided no contraindication exists, the drinking of an extraordinary large quantity of water or other fluid (as described in Lesson X in the footnote on page 252) may prove helpful. It should be understood, however, that if the fever is reduced in this manner, this is only controlling a symptom. Relief from fever may give opportunity for recuperation and in the long run save life, but merely lowering the body temperature does not eliminate the *cause* of the fever. It is therefore necessary to emphasize strongly that as rest was previously necessary to assist in providing favorable conditions for healing, rest continued for a long period will probably be in order after the fever is lowered.

6. Forced Feeding. If the patient is persistently losing weight and strength, provided the condition of the digestive and other organs permits, the quantity of food may be cautiously increased (see discussion of forced feeding and related topics in Lesson X), or, if thought advisable, the Russell treatment, described in Lesson XV, may be resorted to.

7. Exercise on Alternate Days. If one has begun to exercise, and finds that slight temperature rises are produced, or other symptoms of merely a mild character persist or recur, the difficulty may perhaps be obviated by taking the walks only every other day or even every third day. In some cases it appears that the taking of even very short walks causes quite a little stirring up of the lung condition which does not quiet down before the next day, but if the walks are spaced farther apart tho still taken regularly, they may be taken not only without harm but with benefit.

BATHING AND MOIST APPLICATIONS IN TUBERCULOSIS

How Frequently Should One Bathe? Just as some persons perspire more freely than others, so there is a great variation in the need for cleansing baths. For this purpose a bath once a week suffices for certain individuals, whereas others just as urgently require a bath once daily. In general, a bath at least twice a week is desirable. The bathing should not be so frequent as to cause weakness, and for the same reason the bath should not be too long nor the water unduly hot. It is usually best to bathe in warm, rather than hot, water. For bed patients, a warm sponge bath once a day ordinarily answers the purpose of cleanliness satisfactorily.

Cold Bathing. In addition to its function as a cleansing agent, the external application of water is often useful to the sick in other ways. For example, the cold sponge bath is refreshing and, like fresh air, serves as a valuable tonic, and its continual use helps materially to improve the functioning of each cell and organ of the body. Also, to a limited degree, the application of cold directly reduces the bodily temperature, but, contrary to a rather prevalent opinion, this action is of minor importance even in fever cases. Given properly, the cold sponge bath is suitable for a large proportion of patients, and if the bath is administered by an attendant it may be given to patients who are still in bed. REMEMBER: Unless advised to the contrary by a physician skilled in dealing with tuberculosis, the cold sponge bath (or any other form of cold bath) should not be taken for at least several days following the spitting of even a small amount of blood.

Directions for Taking the Cold Sponge Bath. Ordinarily the baths should be taken regularly once daily—as a rule preferably in the early morning, altho for special

reasons it may be advisable to take them at some other hour. It is well to arrange the requisites of the bath—a rough wash cloth, a basin of cold water, and a coarse towel, the night before—so that no time need be wasted in preliminaries during which chilling may occur and the zest for the bath may be lost. Immediately on arising, the surface of the body should be quickly sponged, meanwhile applying gentle friction; and at once followed by a brisk toweling.

A cold feeling when the water is first applied is of course to be expected, but this should not last long, and it is essential that a reaction follow. **This reaction is made evident by a pleasant tingling of the surface of the body, by the reddening and glowing of the skin, and by an agreeable feeling of general exhilaration, warmth and comfort.** The shock of the cold water, the quick termination of the bath, and the rubbing, all contribute to this effect. For the early morning bath, taken for its invigorating effect, five minutes is in most cases amply sufficient for the whole bath; and until the reactive power is accurately gaged it is a wise precaution to end the bath sooner than this. **A bath so long in duration as to overstep or wear out the reactive power is distinctly harmful.**

If there is reason to suppose that the reactive power is weak, it is sometimes well to take the first few baths in modified form. The first bath may be really an air-bath, consisting merely of the exposure of the skin surface to the cool morning air, followed by a brisk rubbing. The next day a very little water, barely cool, may be used; the following day colder water may be applied judiciously—and so on. A warm drink taken a few minutes previous to the bath will favor the development of the reaction. Inasmuch as a certain amount of shock—yet only a mild shock—is desired from the application of

the water, it is not advisable to begin the sponging with warm water and then to lower the temperature of the water while the bath is being taken, but each day the water may be made a little cooler and the period of sponging slightly lengthened. Until thoroughly accustomed to the cold water, the exposure of more than a small part of the body at one time should be avoided. Thus, one arm may be sponged, rubbed and covered, and the bathing continued in this manner until, part by part, the whole body has received the treatment. Standing with the feet in warm water while the cold water is being applied to the body is another useful help for those whose reactive ability is under par. Until this power becomes well developed, it may perhaps be advisable to bathe only the shoulders, chest and arms, later extending the area as one becomes more resistant to the cold.

It should be understood that while some friction is necessary, the toweling should not be so vigorous as to cause violent exertion. Likewise, care should be used in rubbing the chest, and only very moderate force used in this region. If moderate rubbing leads to manifest shortness of breath or tires one, this part of the procedure, at least, should be delegated to friendly assisting hands.

It is ordinarily unprofitable to add any ingredient to the bath water, altho in some cases the addition of alcohol or a quantity of table salt seems to enhance the beneficial effect.

If the cold bathing seems to be harmful rather than helpful, desist.

For some individuals a quickly terminated sponge bath is a suitable ending to a warm cleansing bath.

Cold Sponging During Fever. Cold baths are sometimes of considerable benefit when the fever is high, but

even then the reduction of the fever is only one of the reasons for applying cold. Here again, the indirect effect of the bath on all parts of the body—in stimulating and strengthening each organ, in aiding the elimination of poisons through the kidneys, bowels and perspiration, and in promoting restful sleep—these and like influences constitute the principal reason for giving the bath. The reduction of the fever, tho a valuable effect, is accomplished only to a slight or limited extent, and is in fact of secondary importance.

When fever is the chief indication for using cold, the patient will be in bed, and it goes without saying that the bath should be administered by some other person. In general, the rules are the same as set forth above, but in fever cases it is often desirable to prolong the bath to fifteen or twenty minutes. If discretion is used in regulating the temperature of the water to suit the case in hand, in exposing only a small area of the body at a time, in gently rubbing the skin while applying the water, and as the bathing of each part is completed, in giving it a fairly brisk tho not too vigorous toweling, meantime noting the effect on the patient and being governed accordingly—much good may accrue from this simple procedure.

A chilly feeling or slight shivering very naturally follows the application of cold, but if the shivering is very pronounced or kept up throughout the full length of the bath or even beyond it, especially if accompanied by a decided chattering of the teeth or a marked blueness of the lips—these are indications for cutting the bath short or for using more friction. After such an occurrence, when administering the next bath, it will be best to use water that is not so cold, to lessen the duration of the bath, to apply less water or more friction—as judgment dictates.

For the average case, water at average tap-water temperature is perhaps most suitable—at any rate for the first bath, or until the reactive power has been tested. An ice-cap or other form of cold application should be applied to the head when giving the cold bath during fever.

If the fever is continuous, the bath may be repeated every three hours if thought best.

Other Forms of Cold Baths and Applications. The cold shower bath, the needle bath and the cold tub-bath, all shock the system pretty severely, and should not be taken save on the advice of a physician familiar with the peculiarities of the given case.

The "drip-sheet" bath is a useful form of bath for patients who are able to be up and around a little, and is especially valuable in relieving nervousness, restlessness and insomnia.

How to Apply the Drip Sheet. While the patient stands in a tub containing warm or hot water, to prevent chilling, a sheet just previously dipped in cold water is wrapt around him as quickly as possible in the following manner: With the arms of the patient held upward, the dripping sheet is first wrapt snugly around the body from the arm-pits down; then, with the arms at the sides, another turn is taken, so that the sheet covers the arms, shoulders and more or less of the neck, thus forming a close-fitting envelop for the body and extremities. Through the sheet the body is now briskly stroked and rubbed, and perhaps slapped with moderate force. Now and then water a little colder than that in which the sheet was dipt, is poured over the shoulders and allowed to run down the sheet. The act of rubbing and occasionally pouring on more water is continued for five or ten minutes, after which the patient is thoroughly dried and rubbed with a coarse towel till a warm glow and flushing suffuses the skin.

In rare instances the water may be poured over the head also, but for the great majority this entails too much chance of taking cold. When this is not done, it is well to fasten an ice-cap on the head just before applying the wet sheet.

In this, as in other forms of cold bathing, the exact temperature of the water, the duration of the bath, the amount of rubbing, etc., are to be governed by the reactive power of the individual patient.

The Wet Jacket. A snugly fitting jacket that comes up close about the neck, with holes left for the arms, is made of several thicknesses of old linen or flannel. Just before retiring the jacket is wet with cold water and fastened carefully in place. A dry flannel jacket, with edges extending an inch or more beyond those of the moist jacket, is then put on over the latter. *Important:* Care should be taken to see that the moist jacket fits tightly against the skin of the chest, and that its edges are well covered by the dry outside jacket. This is to prevent air from entering and chilling the patient.

The jacket should be removed in the morning; and followed by a cold sponge, if customary.

The wet jacket is ofttimes of much assistance in quieting an irritating cough, in "taking the edge off the nerves," and in facilitating sleep.

The Cold Throat Compress. A cold compress applied snugly to the throat at night is quite efficacious in relieving the various distressful feelings in the throat associated frequently with pure tuberculosis of the lungs, but which also occur in tuberculosis of the larynx or voice-box; it helps to pacify an irritating cough and, again, offers relief in throat colds (laryngitis). The directions for making and applying the throat compress are substantially the same as set down above in connection with the discussion of the wet jacket.

LESSON XVI

AND AFTERWARD——

You the Director of Your Own Future

If you wish to insure that your restoration to health is to be complete and permanent, it will be necessary for you to continue to observe regular habits of living and to spare yourself all excess effort throughout life. This does not mean that you must become a chronic invalid, nor does it preclude your taking an active part in the ordinary affairs that make life worth living. It does mean, however, that you must be guided always by your own strength and life resources, not by what someone else does who appears no stronger than you, not by what others tell you to do—nor by what you wish to do. If you will but respect these limitations* you can doubtless accomplish much, and it is even possible that in time you will be able to assume a larger share in the affairs of the world than before your breakdown.

It may be that previous to your first knowledge that anything was wrong with you, you had long been achieving merely a half-way success because you had been laboring under a heavy, tho unrecognized, handicap. Now that you are rid of this encumbrance, if you will merely apply to the future the lessons of living you have just learned, and approach the return to work gradually

* In some cases the best result that can be obtained under present methods is to secure a quiescence of the disease. By learning "how to live with tuberculosis," as someone has said, many in just this condition, have taken an active part in the things that make life worth living, and have lived to a good old age.

by a sort of tapering-off process, it is not at all unlikely that there is a pleasant surprise in store for you.

Scars Not Firmly Set for Years. In Lesson VIII has been explained how the cure of tuberculosis differs from the cure of most other diseases, and how in all cases, even the mildest and slightest, true healing proceeds slowly. It is usually several years after all symptoms have disappeared ere the scars become firmly cemented, and in many cases a certain number of the germs of tuberculosis remain in the lungs indefinitely. The more solid the scars, the more certain the imprisonment of these residual germs, yet it should be made clear that in such instances there always remains the chance of a renewed outbreak, should the local or general resistance of the body be allowed to sink below the safety level.*

Other Organs also Require Time for Recuperation. Another reason for prolonged after-care is that in some cases of tuberculosis the functioning of organs other than the lungs has been seriously impaired (see especially Lessons IV and VIII). Hence, even tho the lungs have entirely healed, the reserve strength of the individual may still be considerably below par, and until all parts of the body have had time to recuperate gradually, caution is necessary. On the other hand, it is very encouraging to note that even in those cases wherein the disease has made its influence felt far and wide, it is

* For this reason, the National Tuberculosis Association is endeavoring to lessen the use of the word "cure" in tuberculosis—the term "arrestment" being preferred. This knowledge should not cause discouragement, as the use of the term, arrestment, is really a safeguard which aims to avoid the false feeling of perfect security created by the employment of the term "cure," which has so often led to the dropping back into faulty methods of living, with a consequent relapse.

According to the classification of the National Association, even the phrase "apparently cured" is not applied until all signs and symptoms other than such as may be due to scars and other *results* of the disease, have been absent for two years under ordinary conditions of life. Let no one tell you, therefore, that your lungs are again absolutely sound and that you are certainly cured until at least several years have elapsed. Understand that even then such a statement is fallible, and that it is the consensus of opinion among all high authorities that time is the only thoroughly reliable test.

astonishing how organs that have been very much crippled will "come back," if only given time. (Read also carefully the passage entitled, "Precautions for Certain Patients," in Lesson IX.)

Having said this much on one side of the question, now a word of cheer may not come amiss. Every now and then an exclamation on this order is heard: "Oh, one never becomes really well after once having tuberculosis! One may improve and seem well for a while, but will at no time be good for much, and a new attack sooner or later is almost inevitable." If true, this would be very discouraging—but let us extract the grain of truth from the statement, and convert it into a grain of wisdom and foresight—into a passport of safety for the future. Let us understand clearly that a relapse into the old ruts of living may lead to a relapse in the disease; let us cling to the truth, on the other hand, that with consistent adherence to a reasonable program in which both work and relaxation play a part, the chance that another breakdown will occur is small indeed.

Importance of Temperate Outdoor Living

Open-Air Sleeping. Fresh air should continue to be one of the outstanding items in your program for health. At all times you should endeavor to obtain an abundance of fresh, pure air, spending as much time out of doors as possible. If your work makes it necessary for you to remain indoors almost constantly during the day, it is all the more essential that you have an open-air sleeping room. Let outdoor sleeping be the key-link in your health armor. When indoors, in addition to making adequate provision for admitting air fresh from the outside and for letting out the impure, stale air, do not forget that keeping the air moving and keeping its temperature and moisture-content properly regulated are

very important factors. Remember the electric fan, and see Lesson XI for practical hints on air-moisture and temperature regulation.

"When May I Return to Work?"

In some cases the answer to this question resolves itself into how long one is able to refrain from work. In other instances, however, work which is agreeable and light, taken up gradually as convalescence continues, is a valuable health-promoter. There is such a thing, of course, as getting too much rest, so when one has progressed sufficiently far there comes a time when some suitable employment, taken up at first merely as an avocation, may prove a blessing indeed.

For those who are more or less given to brooding and fretting, some sort of occupation not only serves to divert the thoughts into more pleasant, wholesome channels, but, as they find themselves day by day standing once again more and more firmly on their own feet in a business way, this concrete proof that they are able to do something useful creates a feeling of intense satisfaction, and a sharpening of the interest in the delights of living that only those who have gone through the experience can fully appreciate.

Guides to Choice of Occupation. In many instances, the return to one's former employment will be best, because one is most familiar with the work; but when it is desirable to exercise a choice in the selection of an occupation, the aim should be to choose some comparatively light work, with the hours for labor minimal and regular. An occupation in which one finds a natural interest and which is enjoyed is to be given preference. The less worry and responsibility involved, the better. Other things being equal outdoor work is better than indoor work, but light work indoors will probably be

more suitable than heavy work outdoors. This is especially true if the outdoor employment is unfitted to the ability or tastes of the individual.

Mental Effort versus Physical Labor. An opinion is abroad that one who has passed through an attack of tuberculosis will as a matter of course fare better by taking up some calling that requires brain work rather than manual labor. This is a question for individual determination. Throughout these lessons the fact has been set down in different ways in several places that mental effort uses up energy and is a drain on the bodily resources and resistance, the same as physical effort. It is often hard to determine which of the two uses up the most strength. This is to a certain extent true all through the disease, but applies with even more force when one begins to take up work again. At this time, unless the inroads of the tuberculosis were extremely severe, a certain amount of physical exercise is not only harmless but actually beneficial. So, also, a reasonable amount of mental activity, if so directed as not to tire the mind and nerves, will be helpful. Nevertheless, it is often a fact that the muscles regain strength and vigor more rapidly than the nerves, so in practise it is often the case that work which requires merely the moderate use of the body and muscles is more healthful than work that entails a large amount of brain activity. On the whole, an occupation that makes necessary enough bodily activity to keep one in good physical trim without strenuous or prolonged exertion; which calls also for a limited amount of mental output, short of producing brain-fag, and without heavy responsibility, will perhaps prove best in the average case.

At all events, unless you are accustomed to farm or ranch work, do not expect to find light work on a ranch.

True, some ranch work is easier than other ranch work, but it is unlikely that you will feel that such work is light unless you have previously done the heavier work.

In Lesson III, under the caption "Choice of Occupation," you will find some other suggestions that may help you in forming a decision.

How to Begin Work. If you can possibly do so, take up the work by degrees, and guard yourself carefully against becoming overtired. It is well to put in only a few hours a day at first, then, as things go smoothly, you may gradually lengthen the time. If it is absolutely necessary for you to begin at once with a full day's work, make it a fixed rule to spend every free moment in the open air. If your occupation is a sedentary one, calling chiefly for mental activity, and if you do not find yourself thoroughly tired when the hour of freedom arrives, it will probably prove profitable, after a preliminary period of rest, to exercise a little in the open air. Ordinarily this means walking or some other mild undertaking for keeping the muscles and circulation in good condition. For some, very light gardening will fill the bill satisfactorily. On the other hand, if your work is mainly physical, it will be safest at first for you to spend your spare time at rest. In this case, on Sundays you can spend a large part, perhaps the whole, of the day, in bed to advantage. Only after it has been proven to your satisfaction that you are standing the work well, should you undertake further physical efforts or seek recreation during your leisure hours.

On Taking a Vacation

No matter how smoothly things go, do not overlook the question of vacation-taking. Whether you feel that you need it or not, endeavor to break away completely

from your accustomed occupation at seasonable intervals. Be sure, also, that you do not make work out of these periods, so that you lose almost as much as you gain by the change. Give them over to real relaxation and recuperation, and you will find that the increased vigor, energy and ability gained more than repay you.

Importance of Regular Outdoor Exercise Provided Conditions are Suitable. Giving due regard to the restrictions on exercise set forth above, as soon as the circumstances in general permit, it is highly important that a reasonable amount of physical exercise be incorporated in your daily program. Whether this consists of a walk of a mile or so, or some other form of exercise, it is important that the exercise be taken regularly—not by leaps and spurts. By paying consistent attention to this point, and by religiously observing regular hours for eating, sleeping, etc., many who have been forced to overtax themselves during working hours, have nevertheless succeeded in preserving vigorous health.

Amusement Suggestions

When conditions permit, appropriate diversions and pastimes assist materially in making the return of health full and lasting. On the other hand, amusements that are unwisely chosen may undo all that has been accomplished.

In the first place, make it a plan to seek your amusements in the open air. For men, enjoying the spectacle of the American national game is one of the safest pastimes, if care is used in guarding against over-use of the voice during exciting moments. Actual participation in this or other forms of violent sport is if course out of the question. By way of comparison, auto races are perhaps a little too exciting even for the looker-on, and the dust is another objectionable feature. As a class,

indoor amusements, of which the "movies" are perhaps the worst, are to be avoided. Some of the more recently built theaters and moving picture "palaces" are provided with efficient means of ventilation, and for cooling or warming the air as desired, but at best indoor air is not as good as outside air, and as one runs the additional risk of picking up a cold or other respiratory infection from one's neighbor, visits to the movies should be few and far between.

Dancing usually calls for late hours and crowd-association, as well as over-exertion—which last is characteristically unnoticed till the damage is done—and is to be considered strictly under the ban.

Dangers of "Colds" and Respiratory Disorders

How to Avoid Them and How to Care for Yourself at the Time. "Colds," la grippe and other disorders of the breathing apparatus sometimes serve to reawaken tuberculosis, so, while one should not live in a continual state of dread of these affections, all reasonable precautions should be taken. For this purpose (1) you should avoid close association with persons who are suffering from colds, sore throat, tonsillitis, la grippe and the like. (2) If, of necessity you must be near those so afflicted, see that you use separate towels and dishes; or make sure that the table-ware is boiled or at least thoroughly scalded. (3) Endeavor to keep the resisting power of the body always at the maximum. The last point constitutes a second valid reason for shunning indoor amusements.

If you catch cold despite precautions, do not trust to chance to see you safely through, but unless it is absolutely impossible for you to stop work, go to bed and care for yourself properly at least until the height of the attack is passed. From then on, favor yourself

with a large share of rest each day until you are confident that you are safely "out of the woods."

Importance of Periodical Medical Examination

If at any time you notice that you are losing strength or weight rapidly or steadily, if the cough or expectoration starts anew or increases, if fever reappears—or, in a word, if you are indisposed in any way, by intercurrent disease or otherwise, medical advice should be promptly sought. Remember that relapses can occur in even the mildest cases, and that, as just stated, other ailments, particularly colds, grippe and pneumonia, are often responsible for a relapse. Fortunately, it is true that many convalescing from tuberculosis have weathered one or the other of these diseases without harm, yet not rarely a renewal of the tuberculosis follows; so all intercurrent conditions are to be considered serious enough to demand immediate treatment.

Irrespective, however, of definite indications that something is wrong, you should make it a point to have your chest examined at frequent intervals. At first this should be done every three months, then every six months; later once yearly may be often enough. If you have been under the care of a physician while redeeming your health (it is highly desirable that you should be), inasmuch as this physician is most familiar with your case it will usually be best to have him make the reexamination. In this way, should the trouble return it will be detected early and, taken in the beginning, it is probable that a short period of partial, or absolute rest, as required, will set matters right.

Do not feel that it is necessary for you to go about constantly hesitating at every step for fear that you will do something that will bring on a set-back. Do not feel that a set-back is almost sure to occur. If the

tuberculosis has been thoroughly arrested, a relapse is unlikely to occur if reasonable care be exercised. Yet if symptoms should return, one should not lose heart, for usually a short period of rest will suffice to clear them up, and things will thenceforward go smoothly.

How Others Have Reclaimed the Maximum of Health and Happiness

After all, the main point is that your future health and happiness largely depends on yourself. Your willingness to live within your limitations is the strongest guarantee that you will hold fast to the prize you have won. As you test yourself out degree by degree, as time passes you will be able to accomplish more and more. If you will put a checkrein on your ambition at the start and keep a firm grip on yourself, little by little you may extend your activities. Hold yourself in until you learn what you can, and what you cannot, stand, and you may look forward to a life of health and happiness. Remember that thousands before you have had experiences similar to your own, have fought the good fight, and "come back" to a life full to the brim with enjoyment and usefulness, and that a considerable number of the world's most famous men and women, after experiencing just such a breakdown in health, which they have fought for and won back, have wrought their deeds of greatest achievement.



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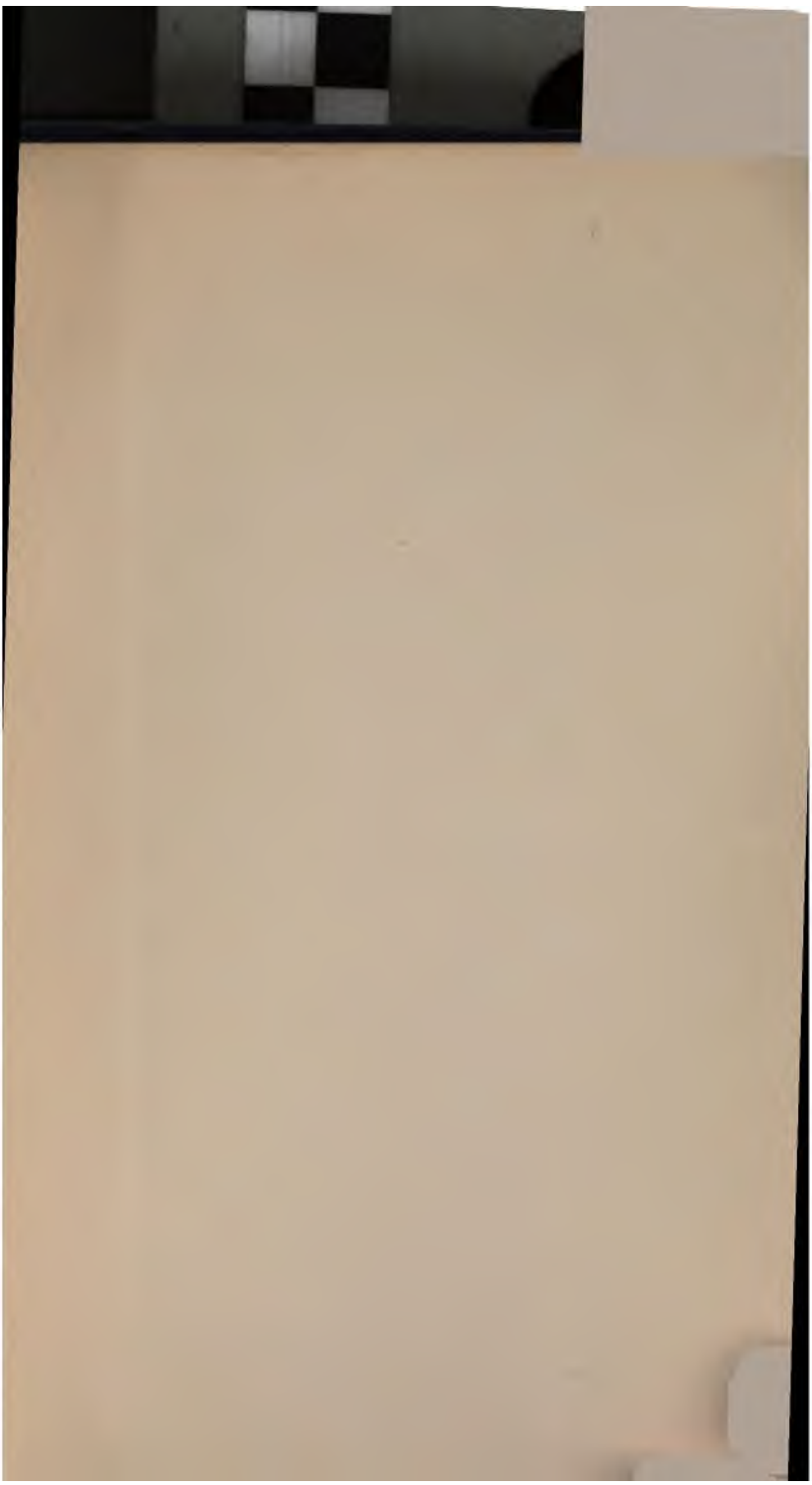
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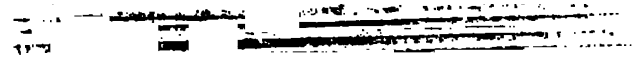
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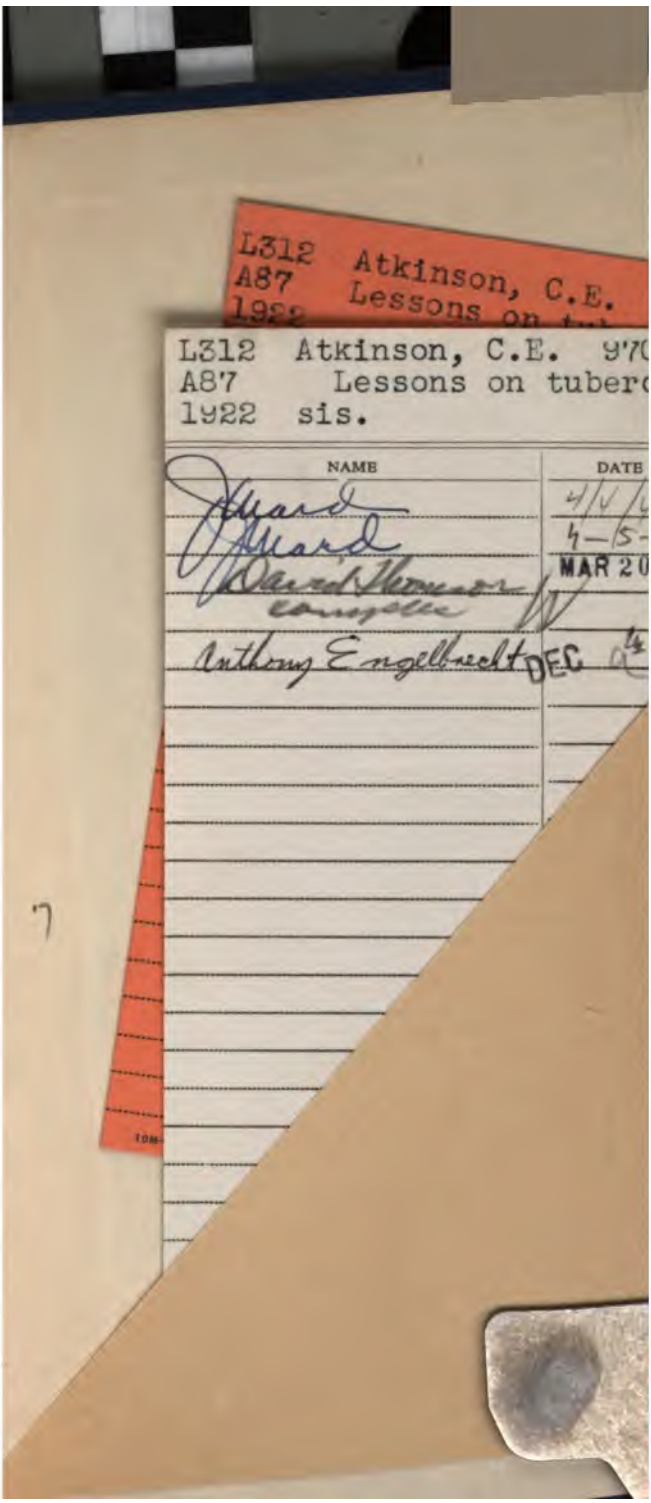
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